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THE IRON AGE

A Review of the Hardware, Iron and Metal Trades.

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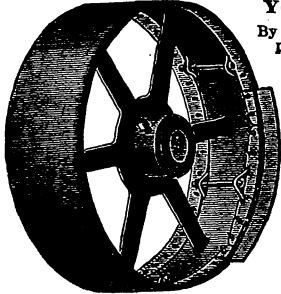
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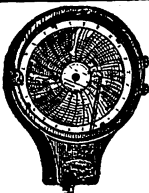
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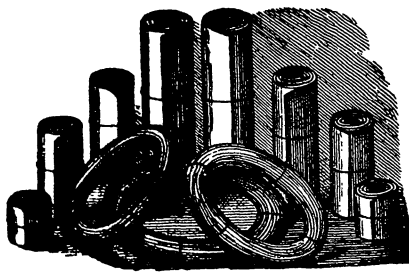
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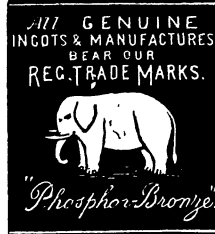
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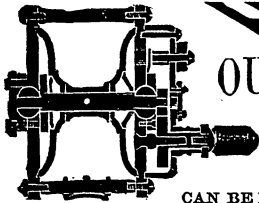
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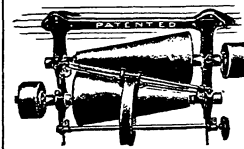
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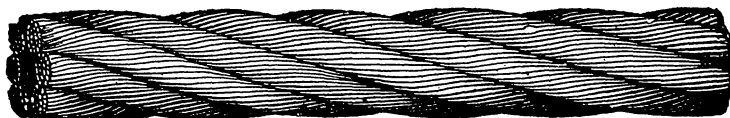
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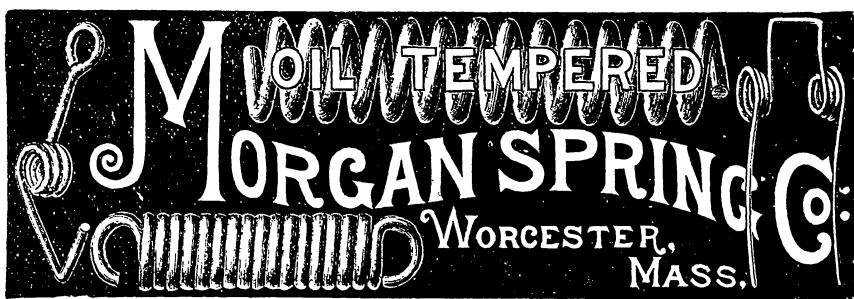
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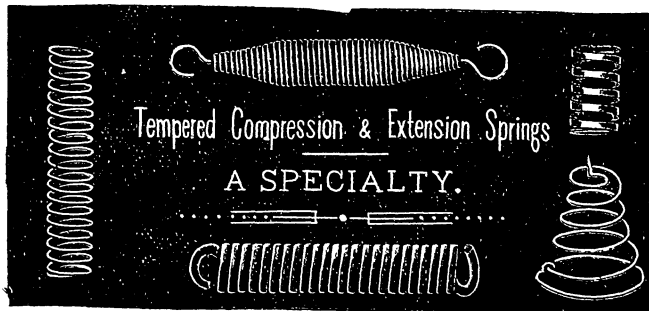


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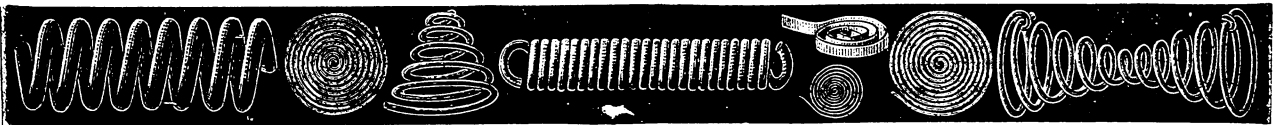
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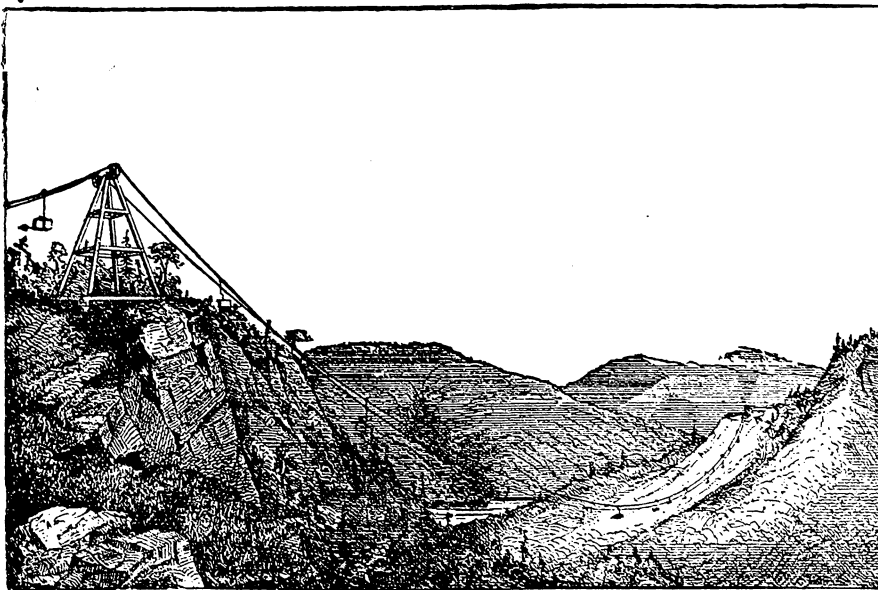
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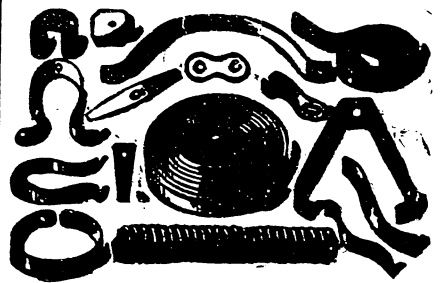
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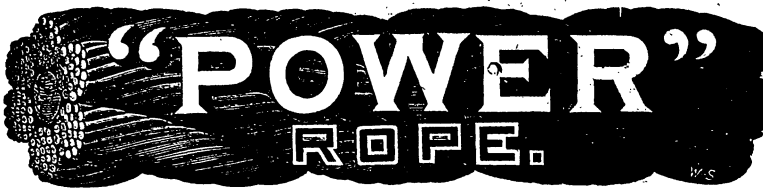
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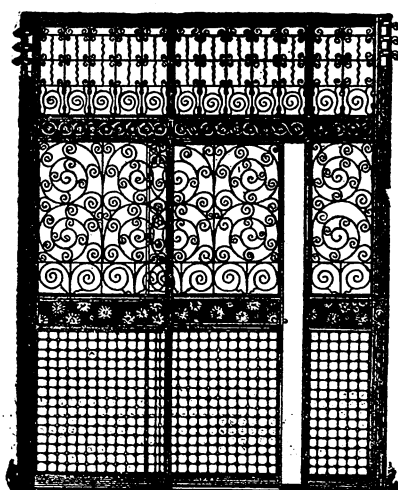
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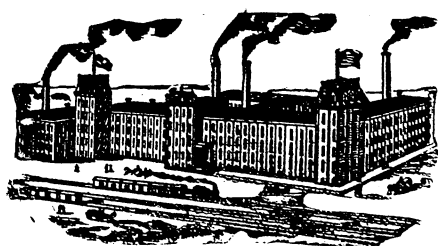
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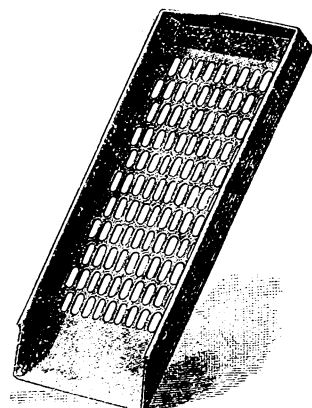
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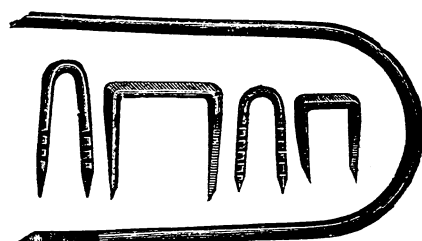


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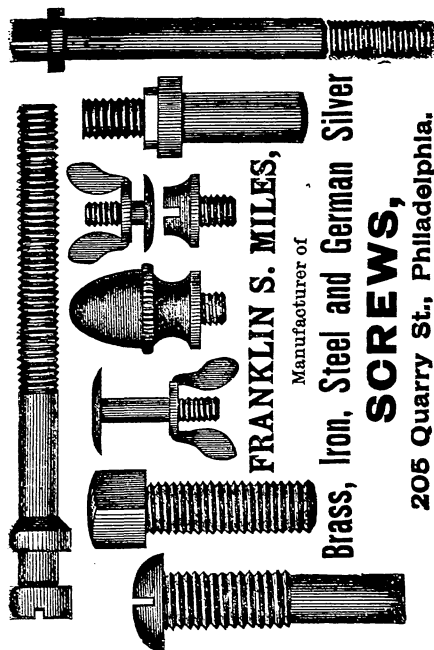
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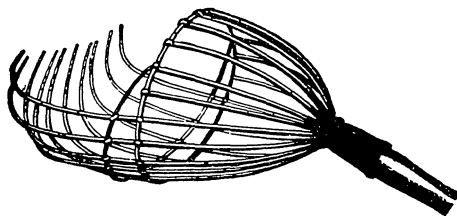
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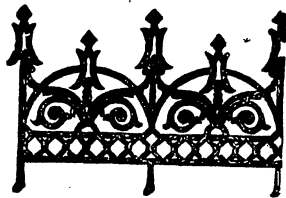
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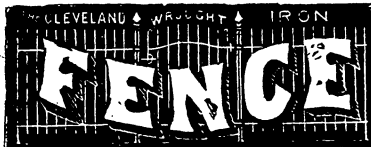
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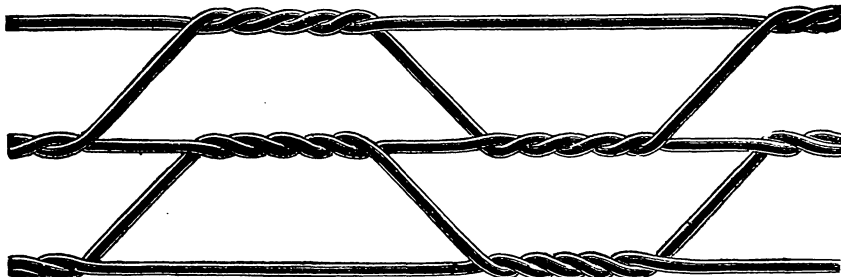


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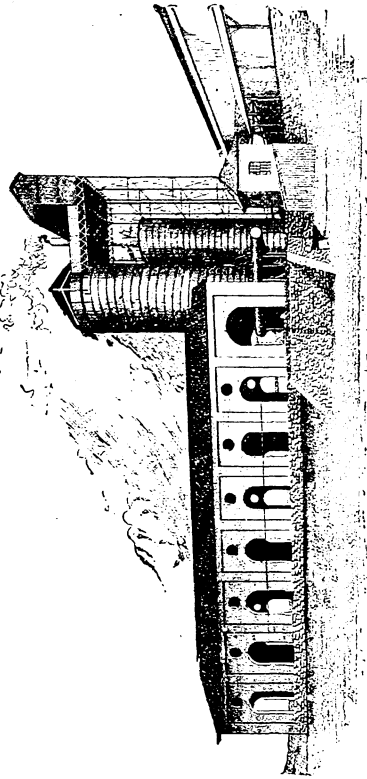
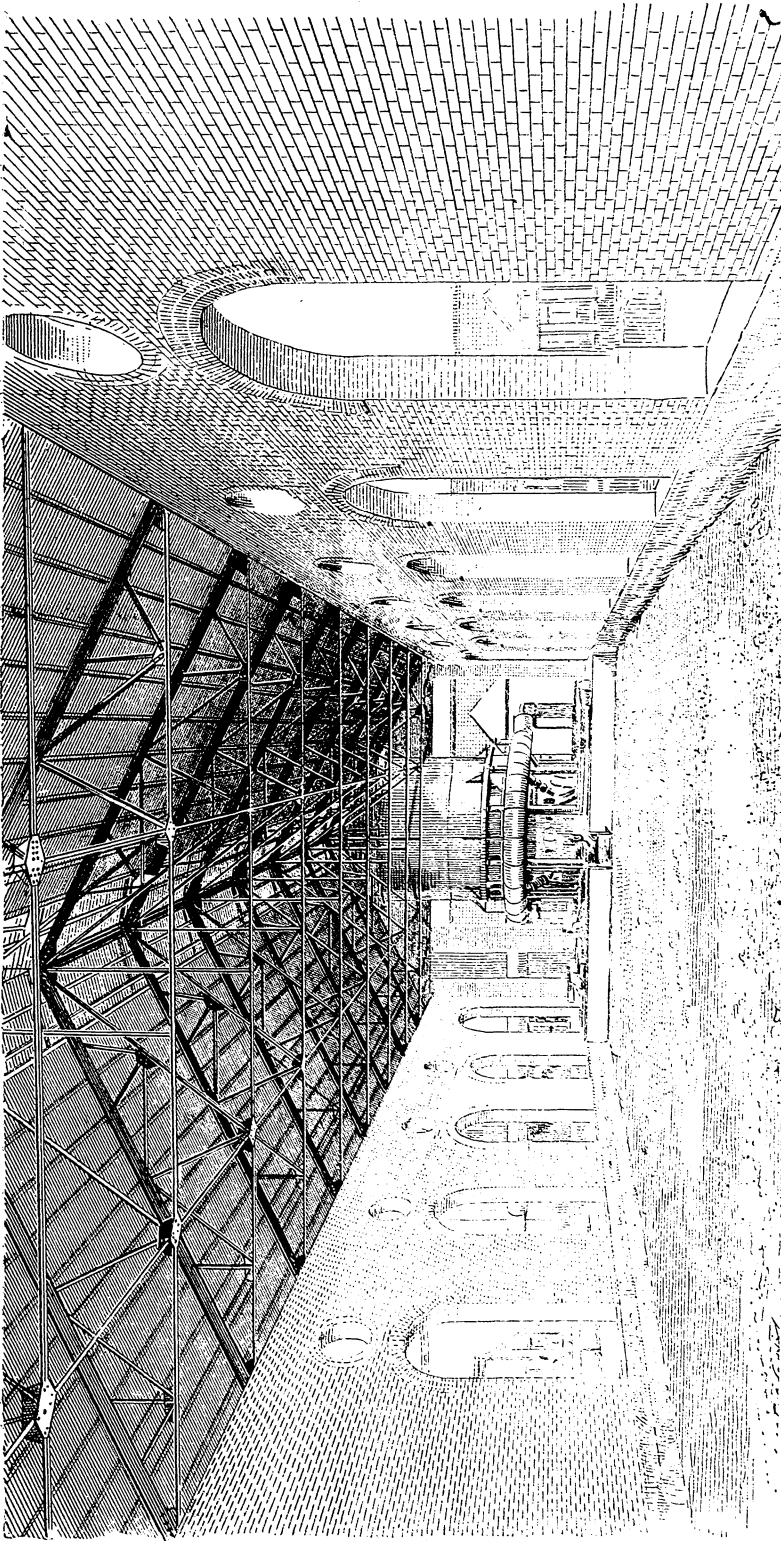
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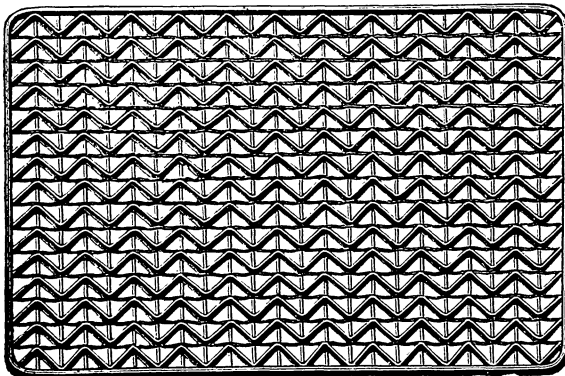
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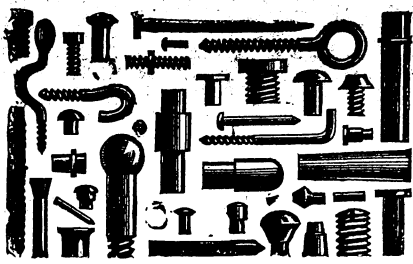
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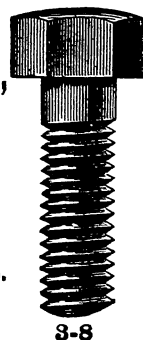
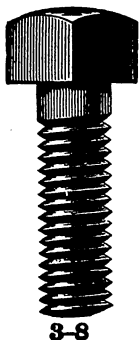
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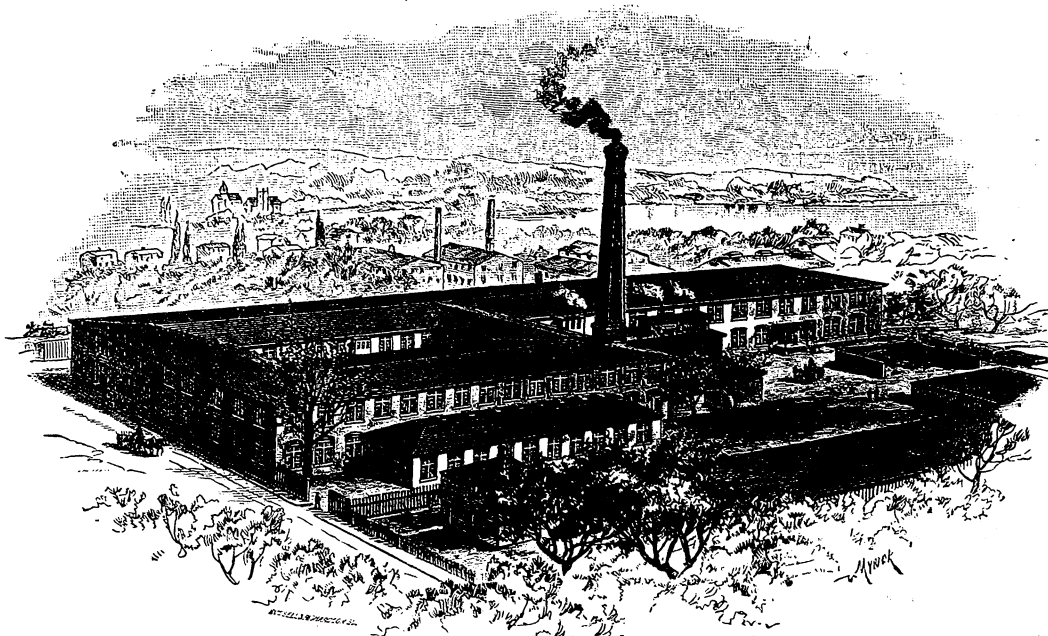
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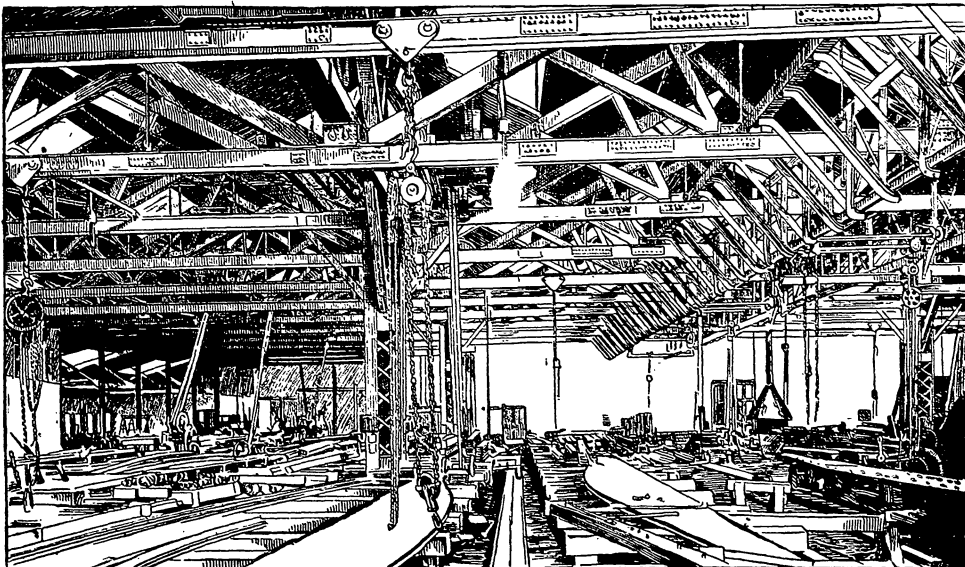
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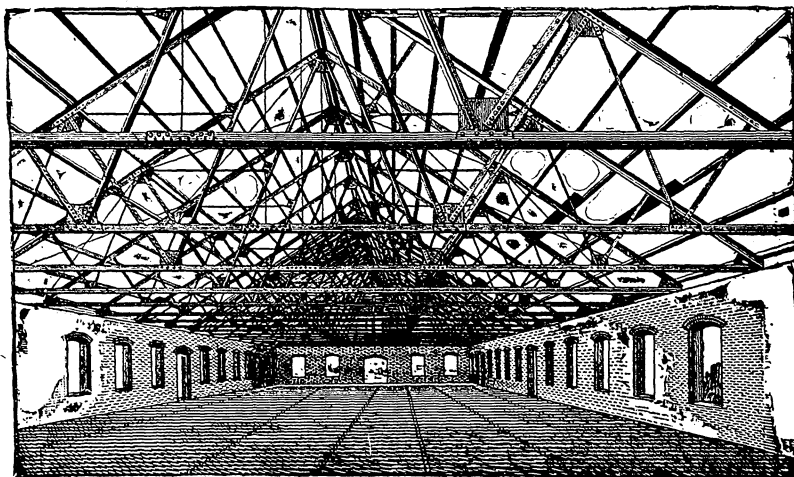
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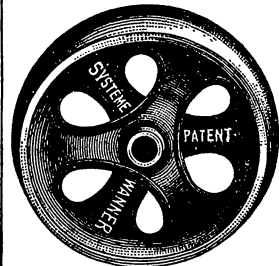
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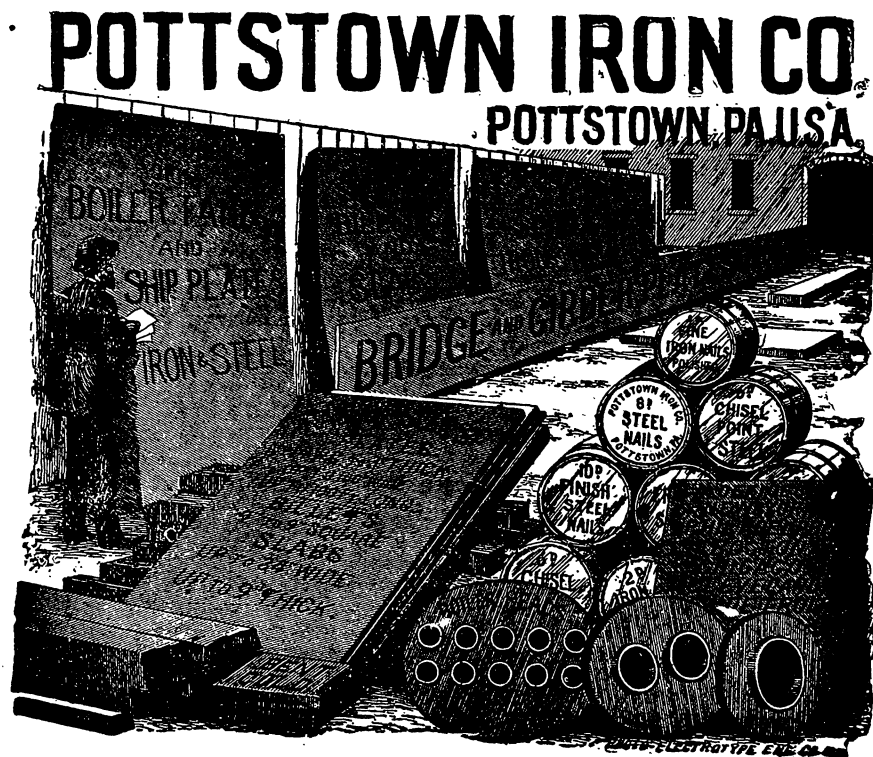
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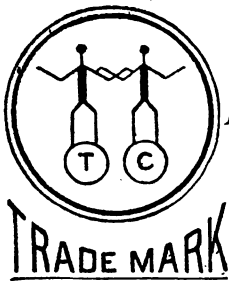
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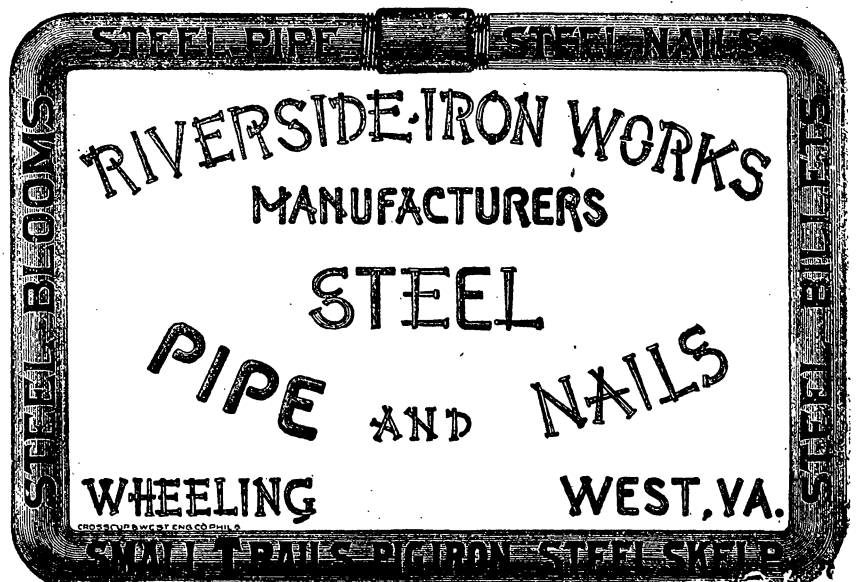
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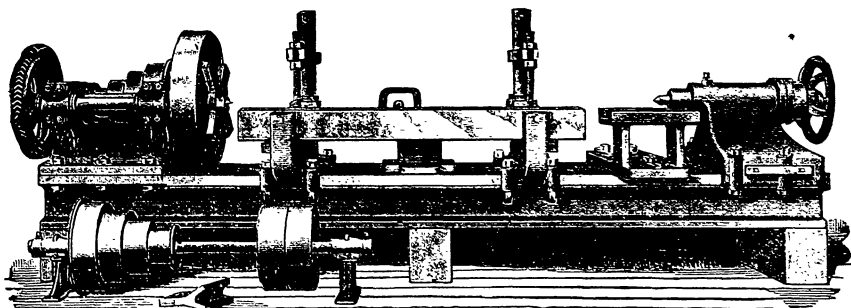
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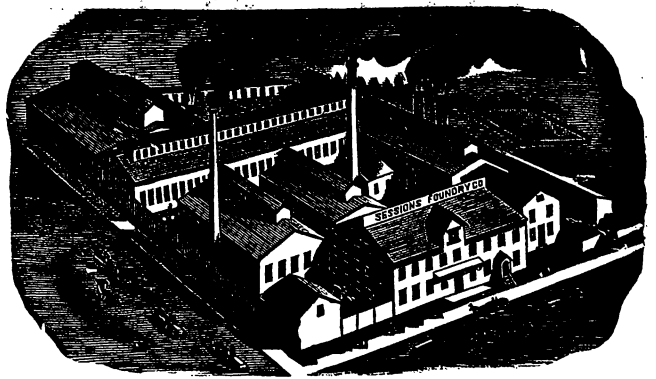
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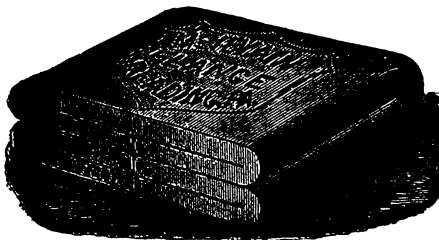
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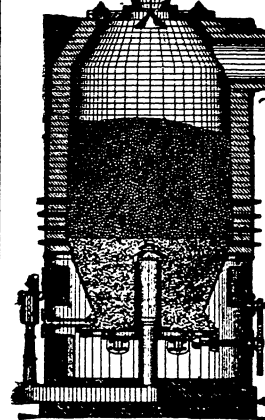
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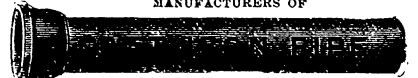
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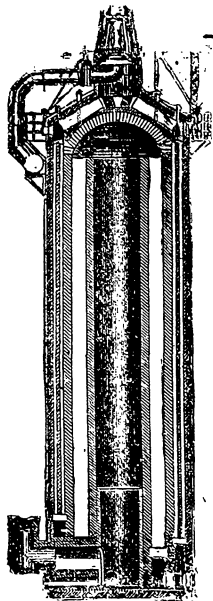
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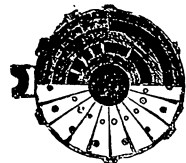
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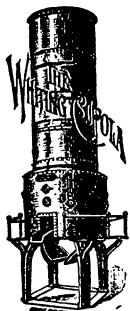
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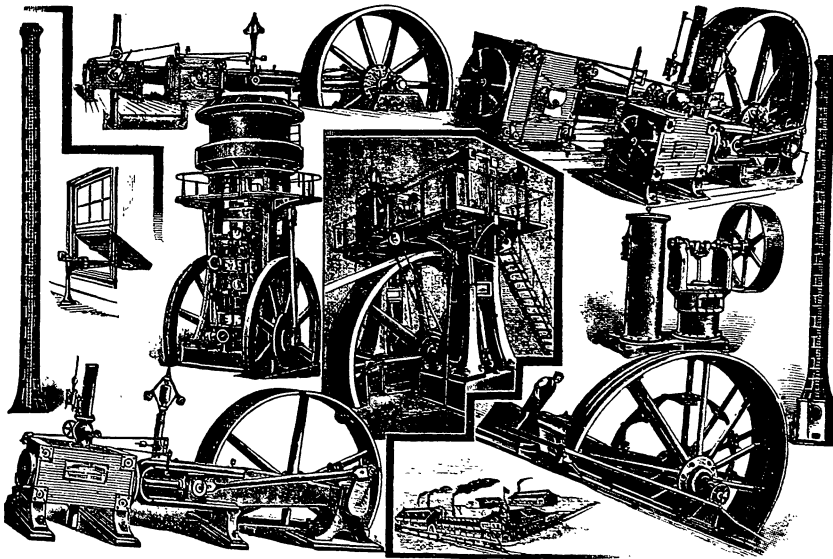
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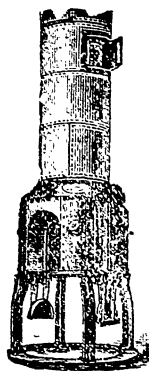
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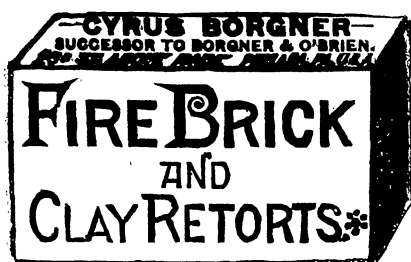
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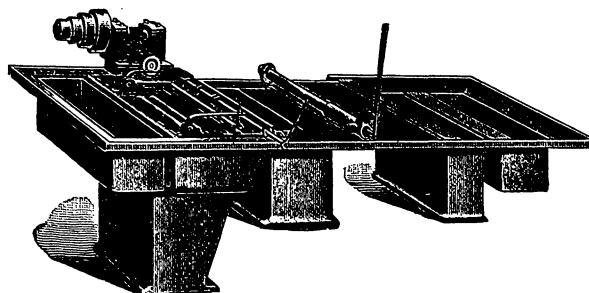
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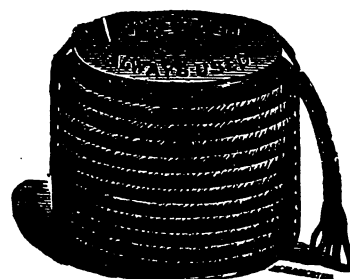
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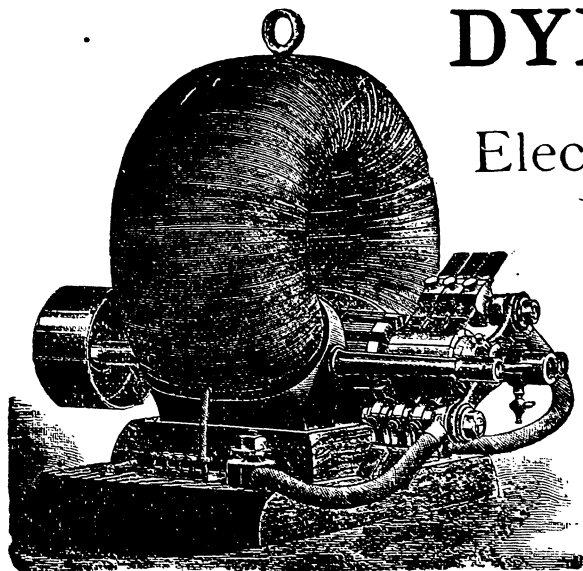
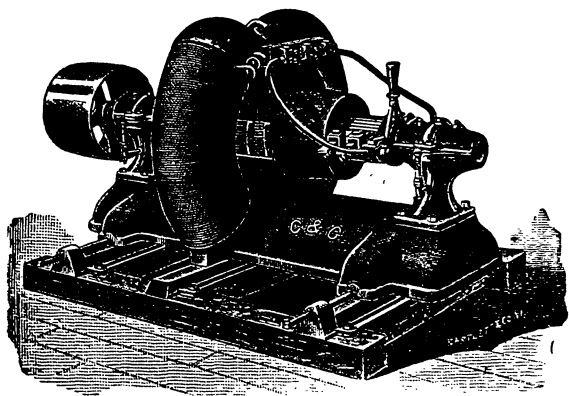
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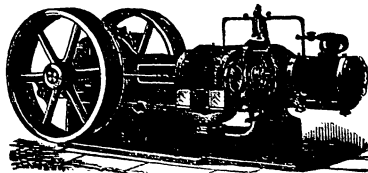
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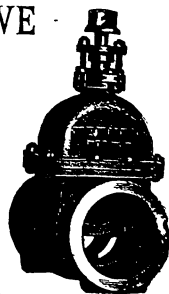
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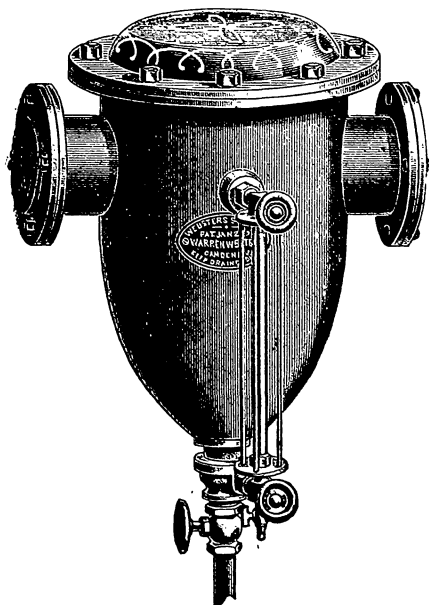
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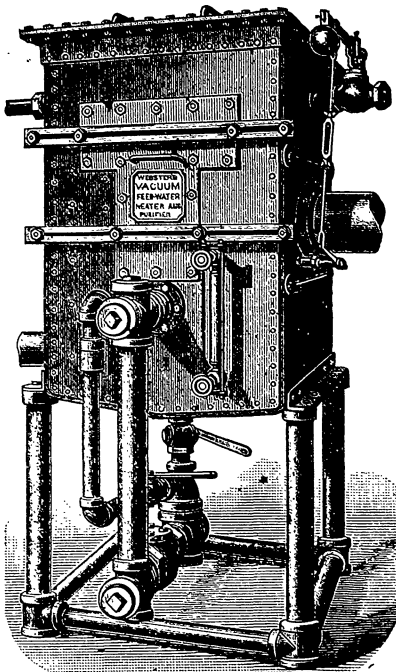
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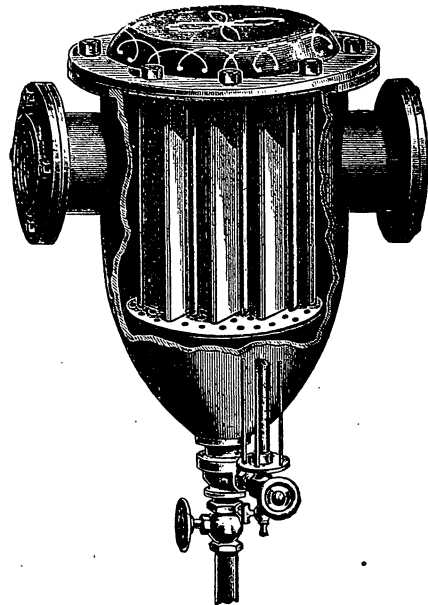
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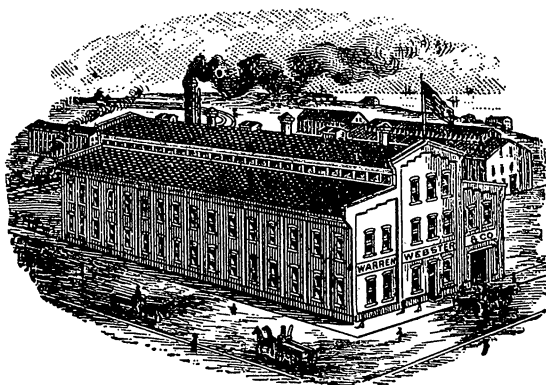
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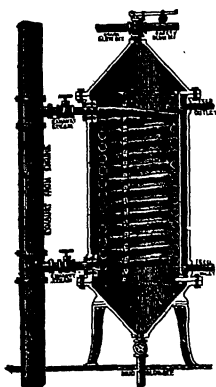


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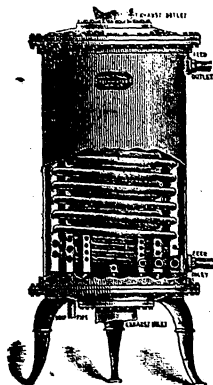
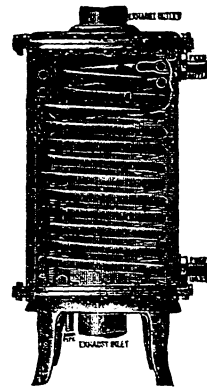
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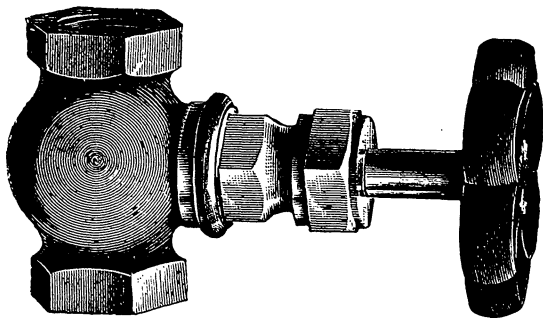
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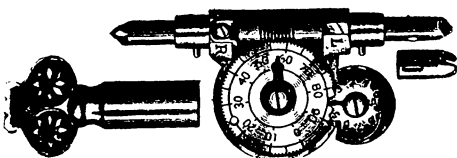
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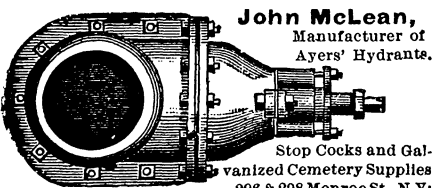
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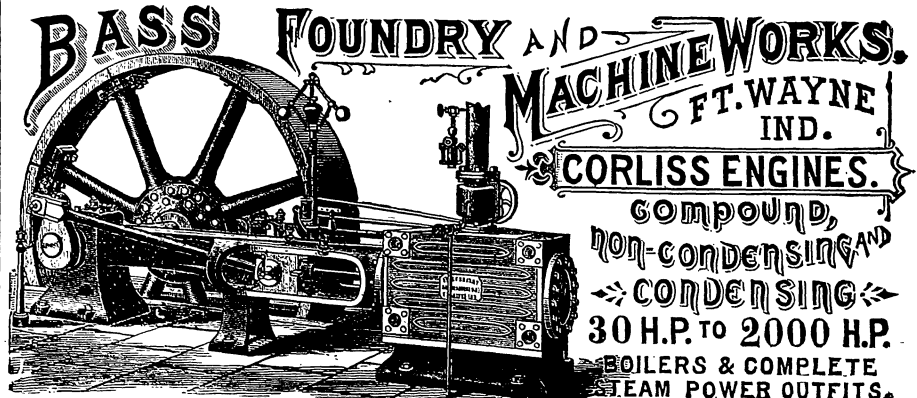
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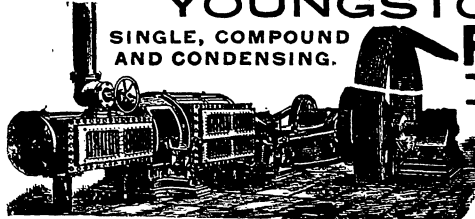


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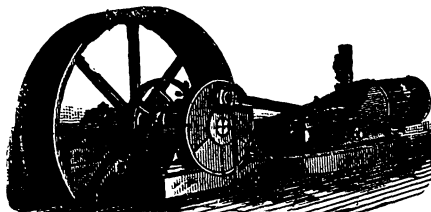
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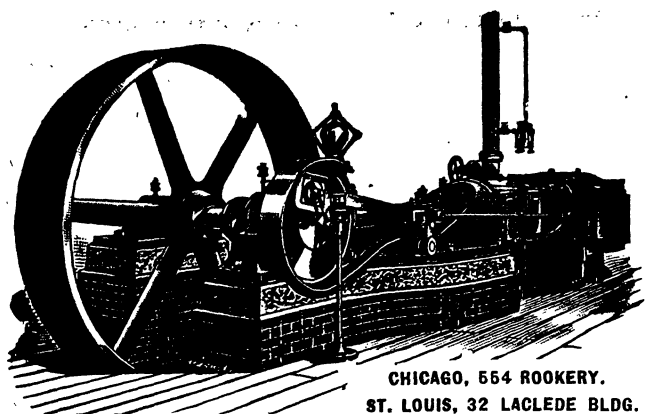
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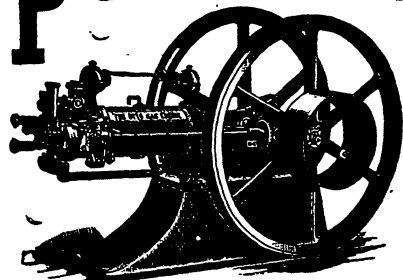
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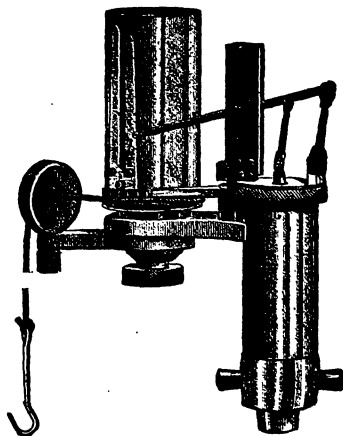
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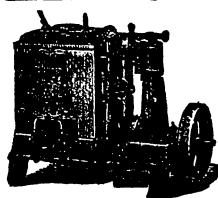


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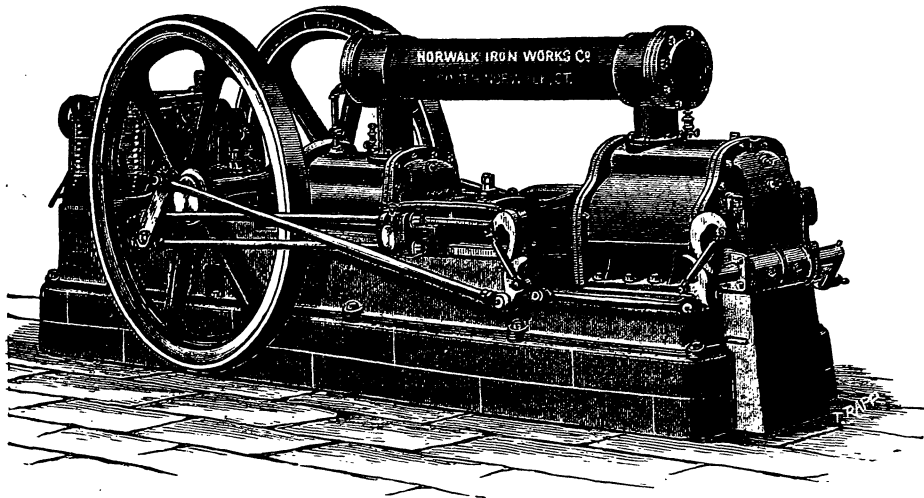


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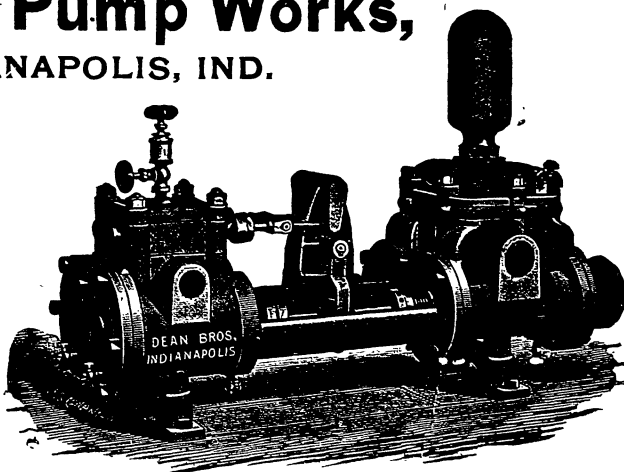
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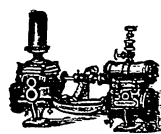
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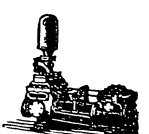
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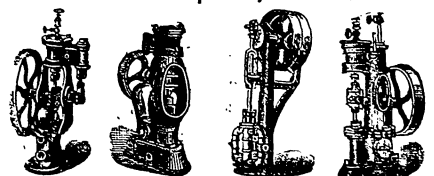


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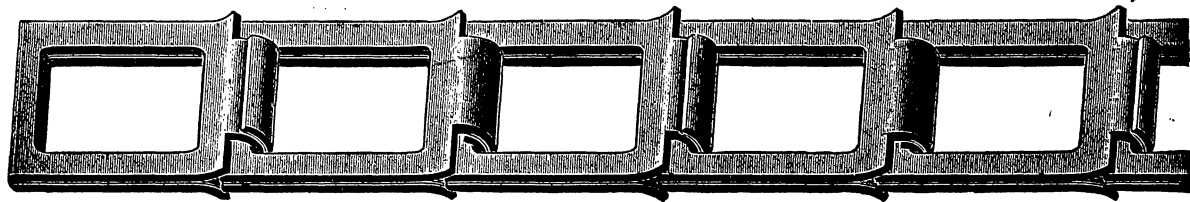
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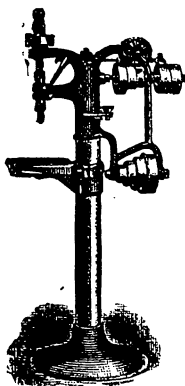
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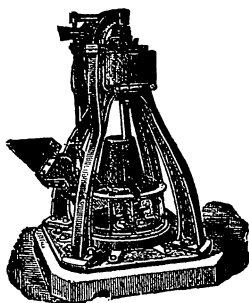
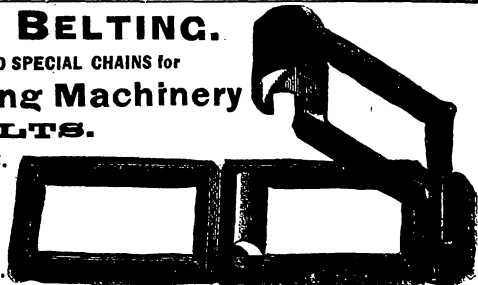
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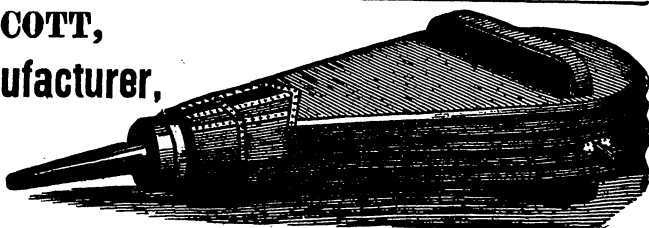


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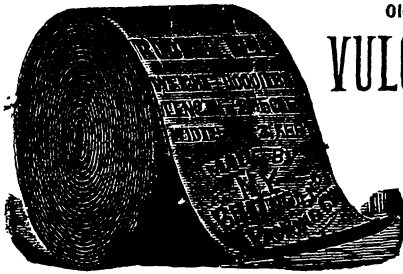
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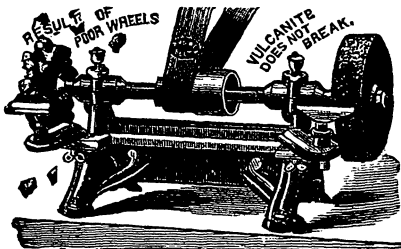
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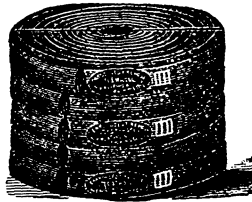
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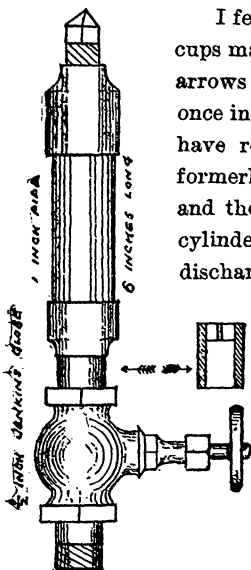


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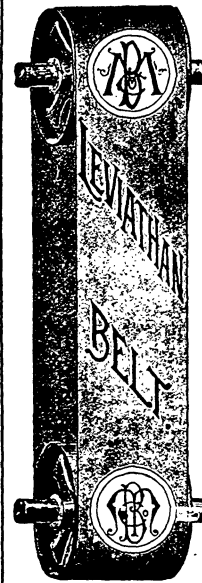
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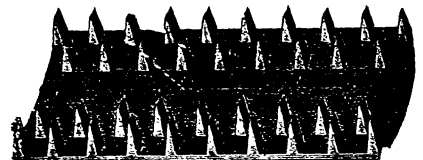
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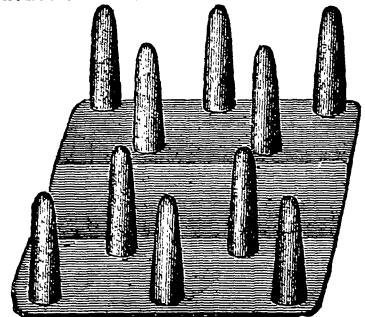
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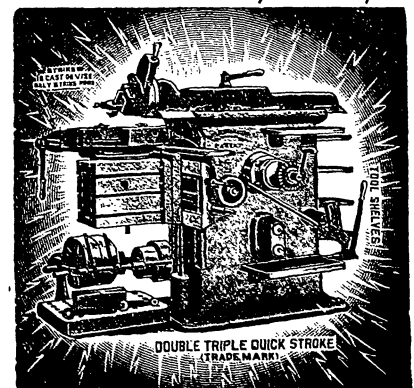


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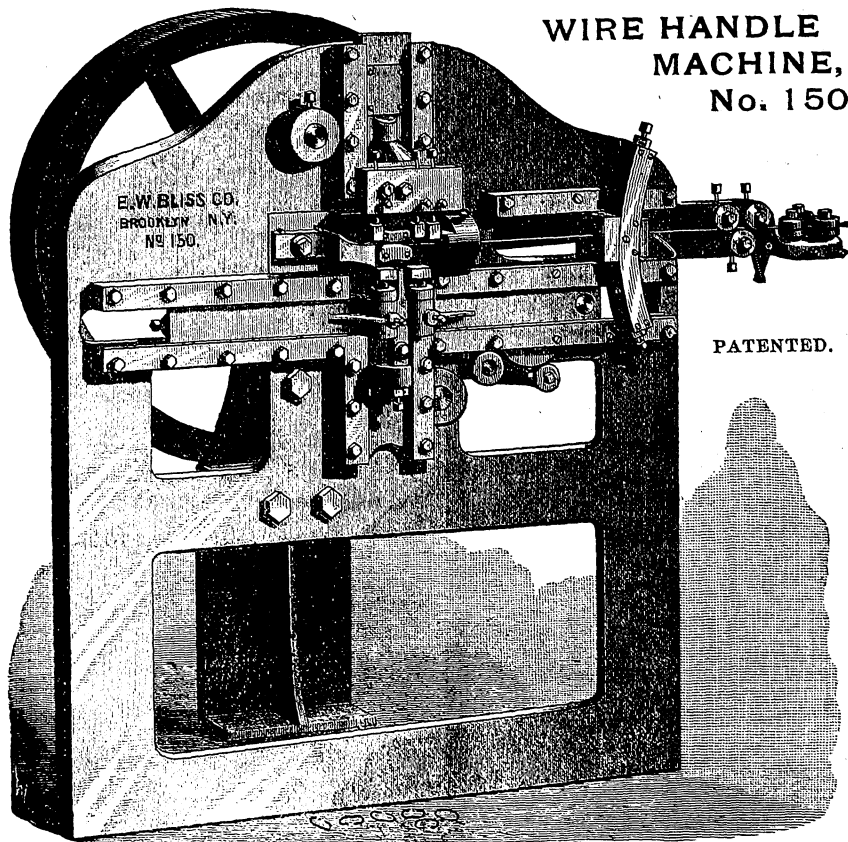
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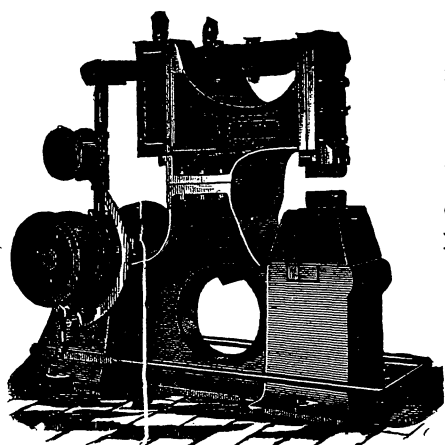
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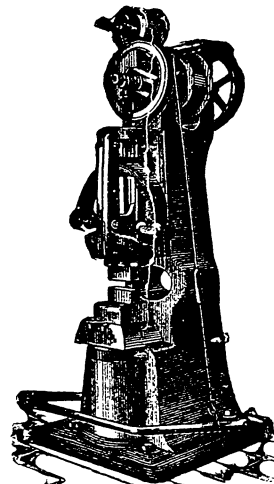
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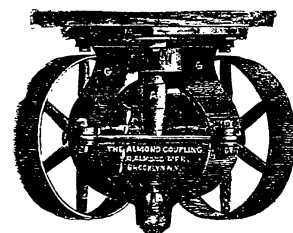
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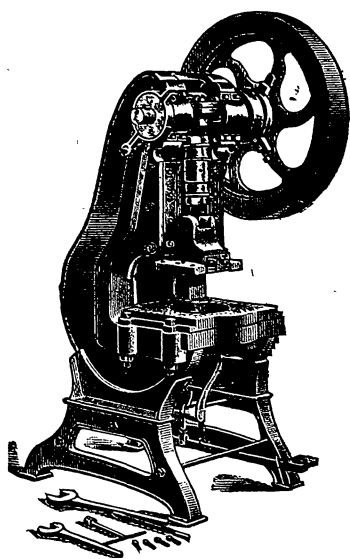


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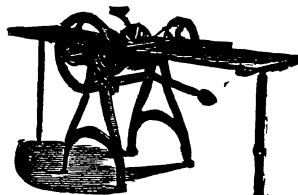
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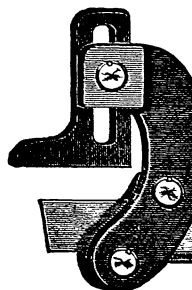


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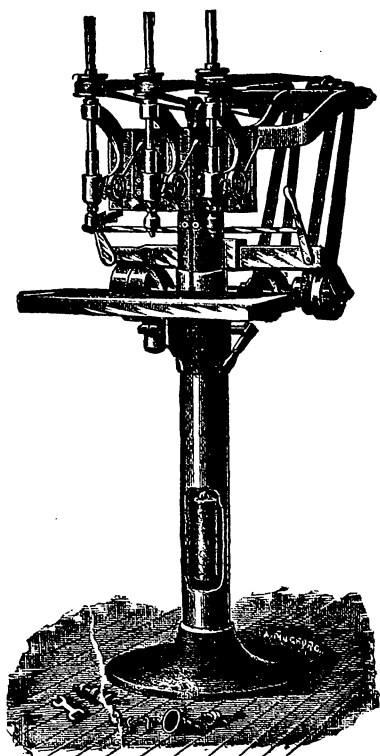
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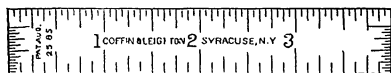
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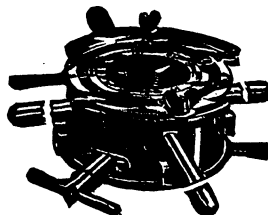
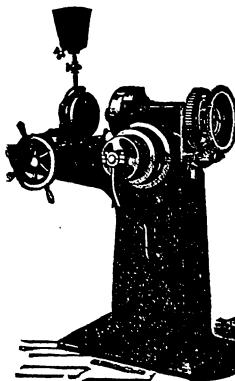
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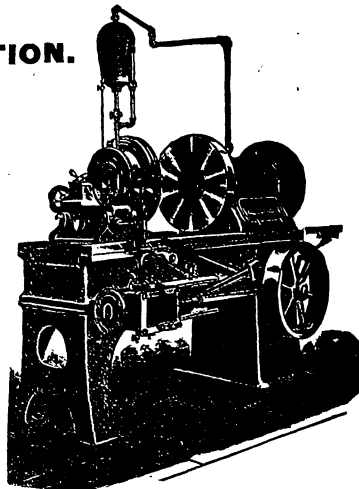
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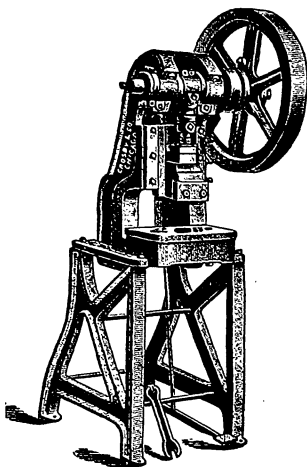


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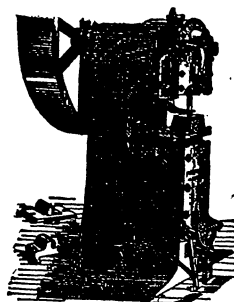
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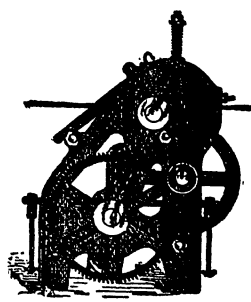
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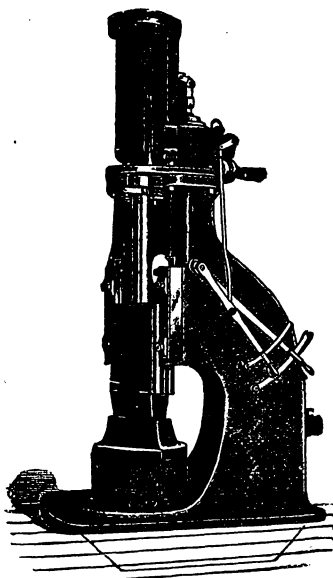
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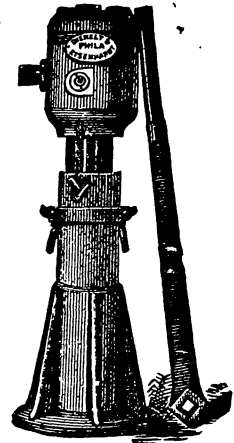
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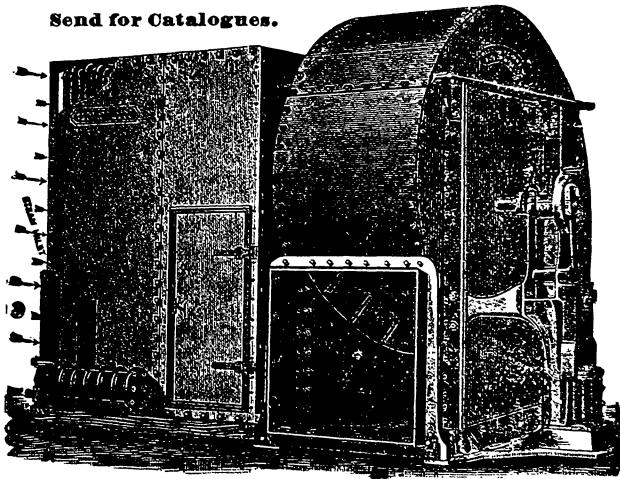
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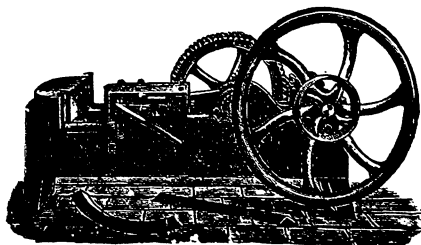
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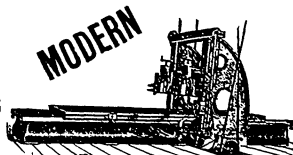
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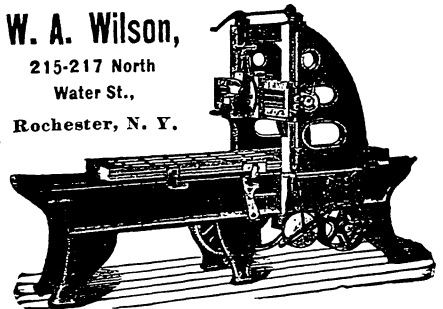
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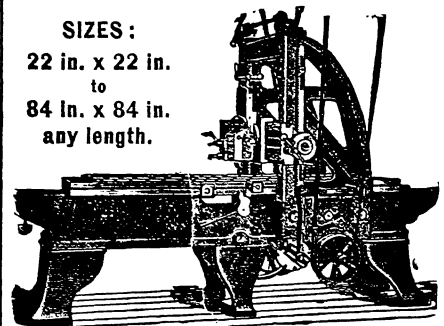


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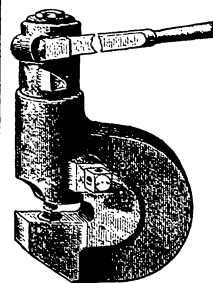
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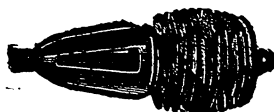
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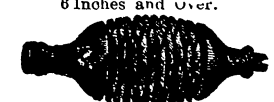
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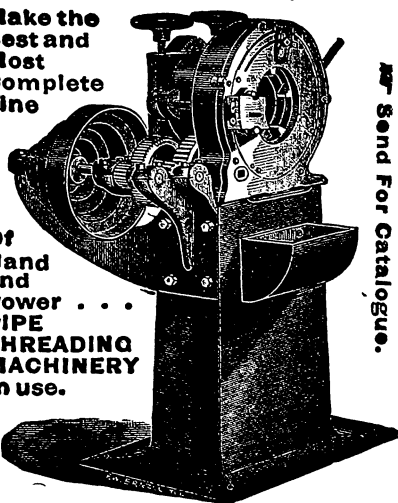
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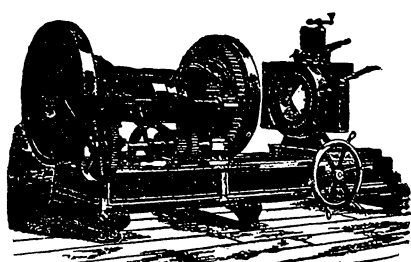
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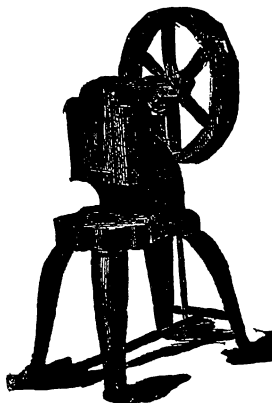


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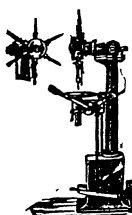
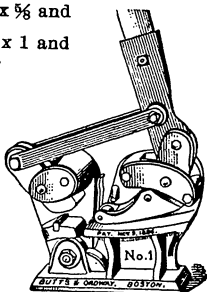
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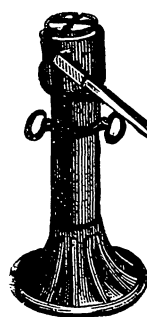
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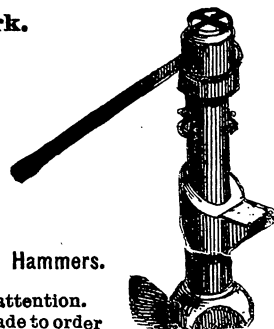
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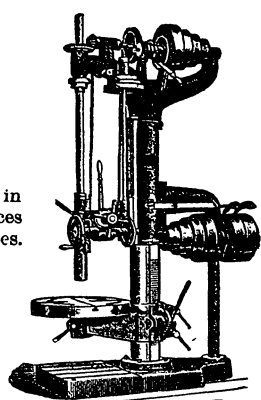
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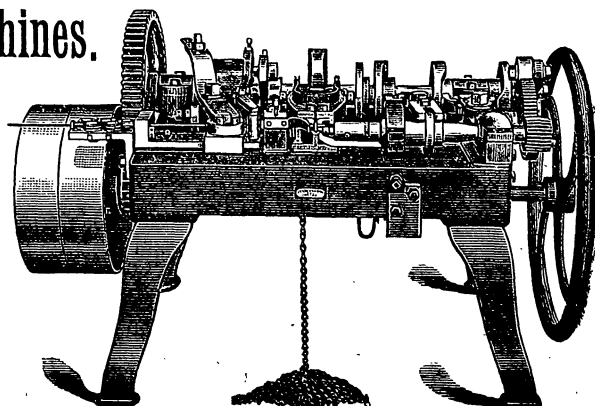
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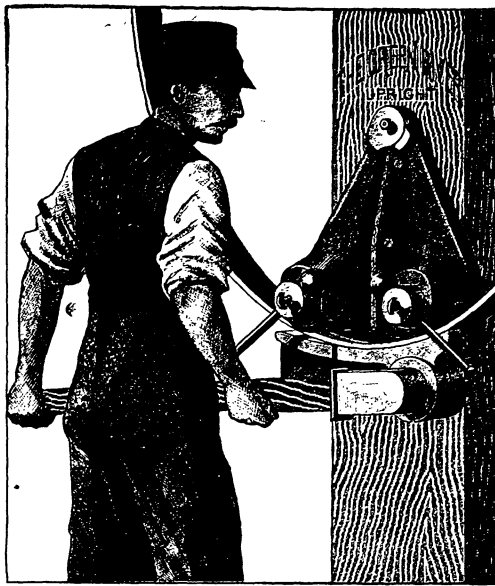
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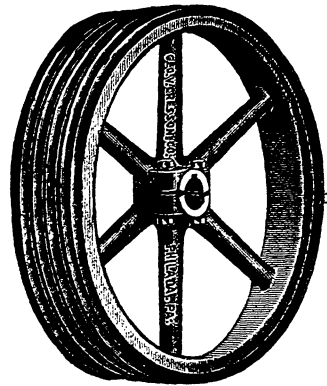
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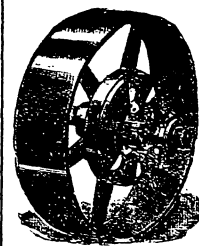
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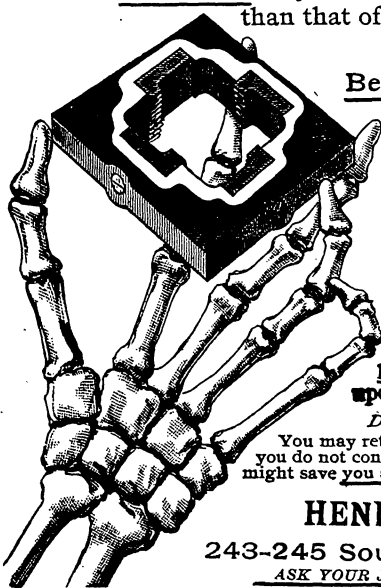
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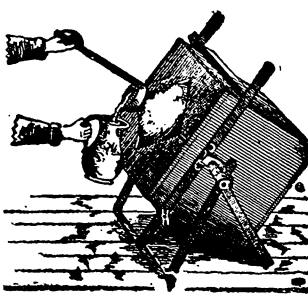
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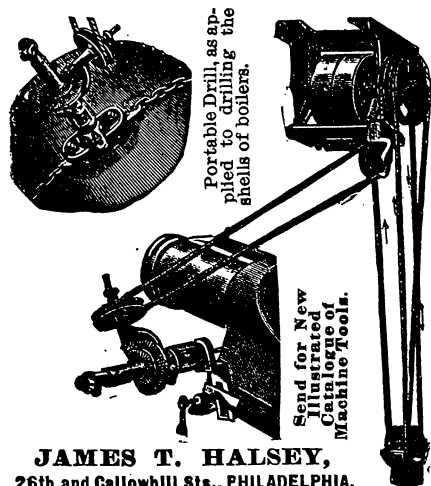
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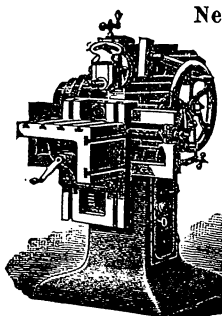
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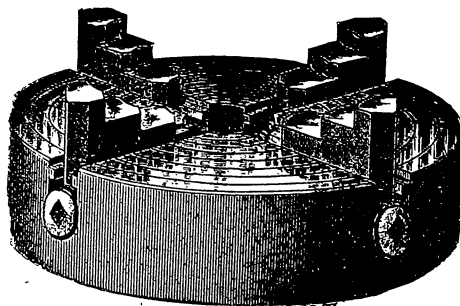
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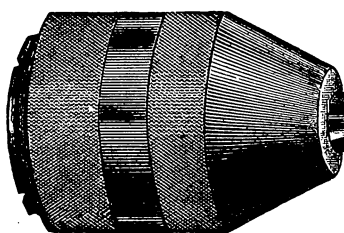
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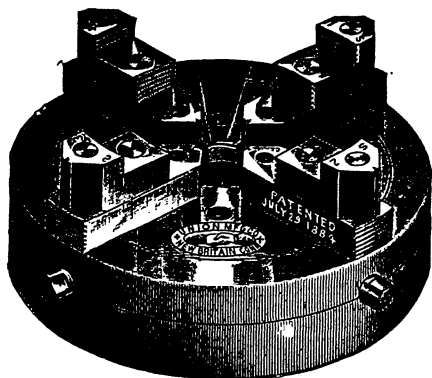
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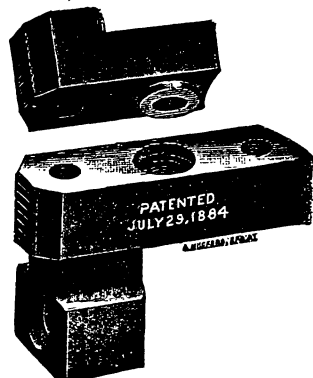
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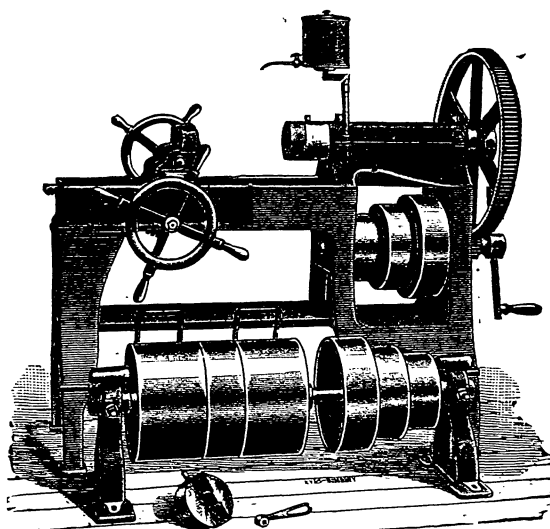
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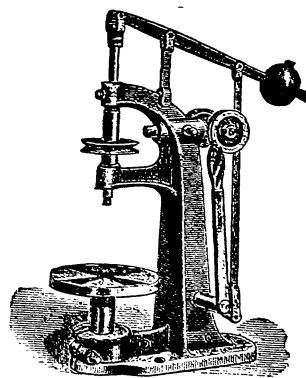
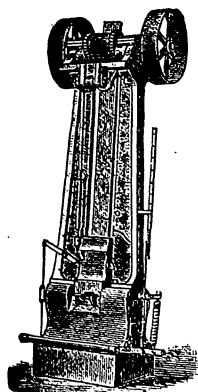
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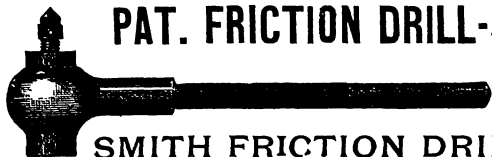


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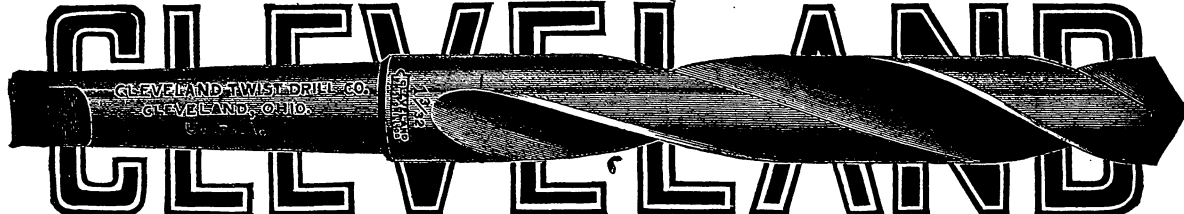
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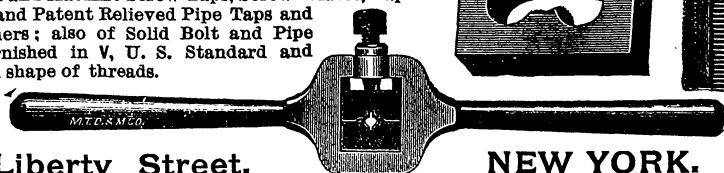
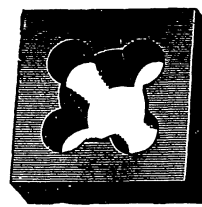
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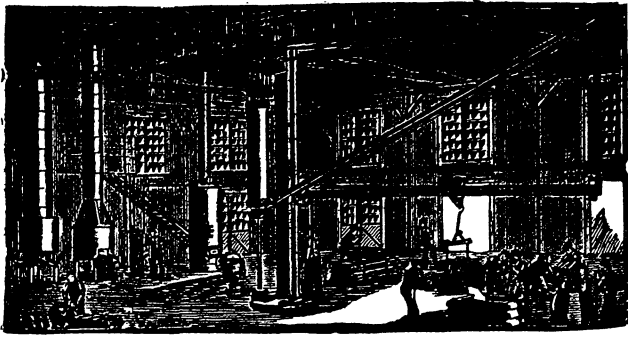
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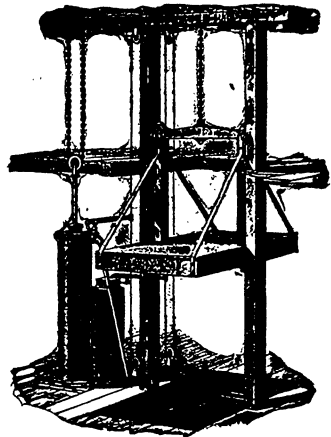
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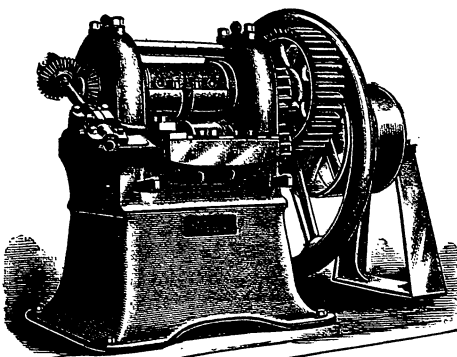
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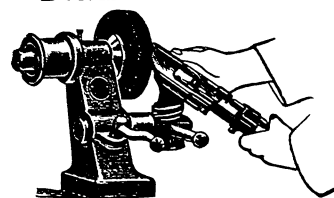
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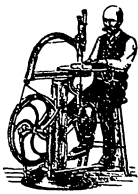
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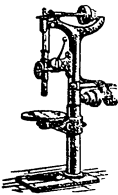
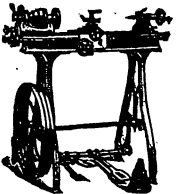


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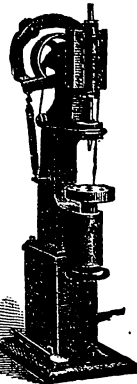
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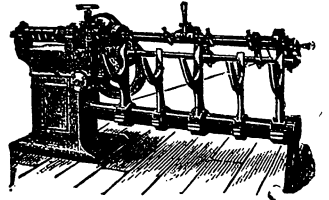
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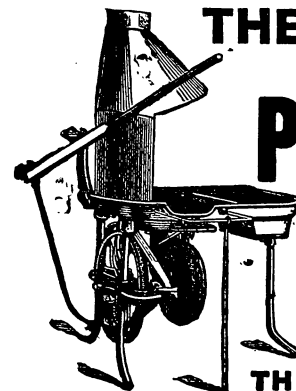
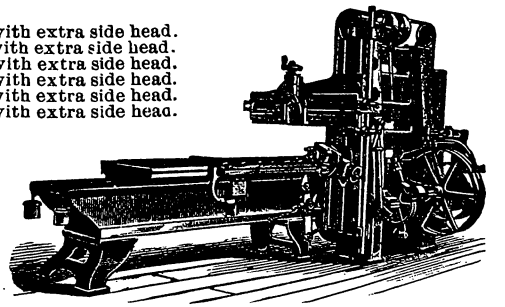


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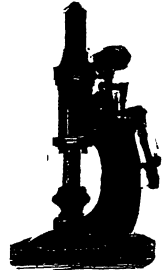


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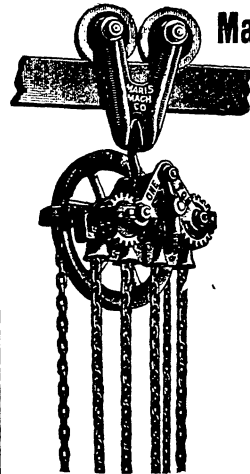
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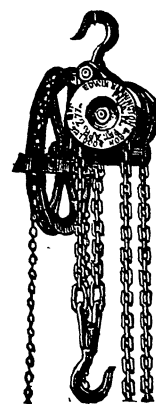
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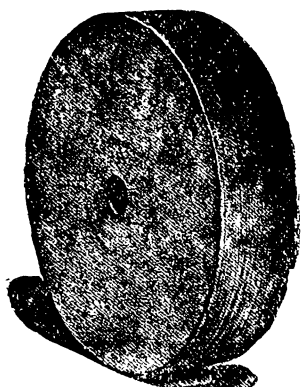
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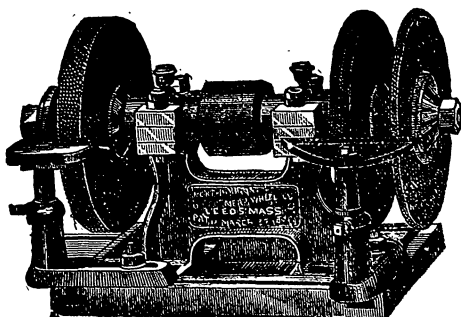
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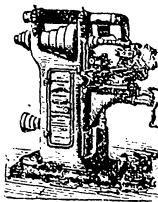
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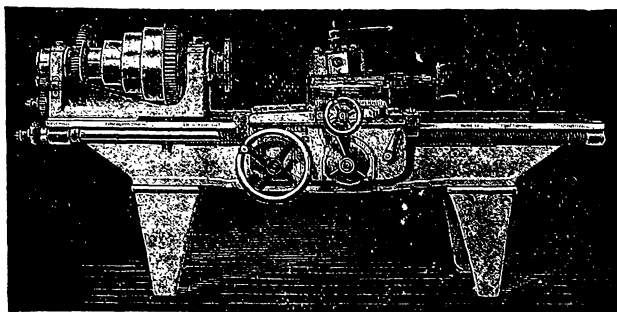
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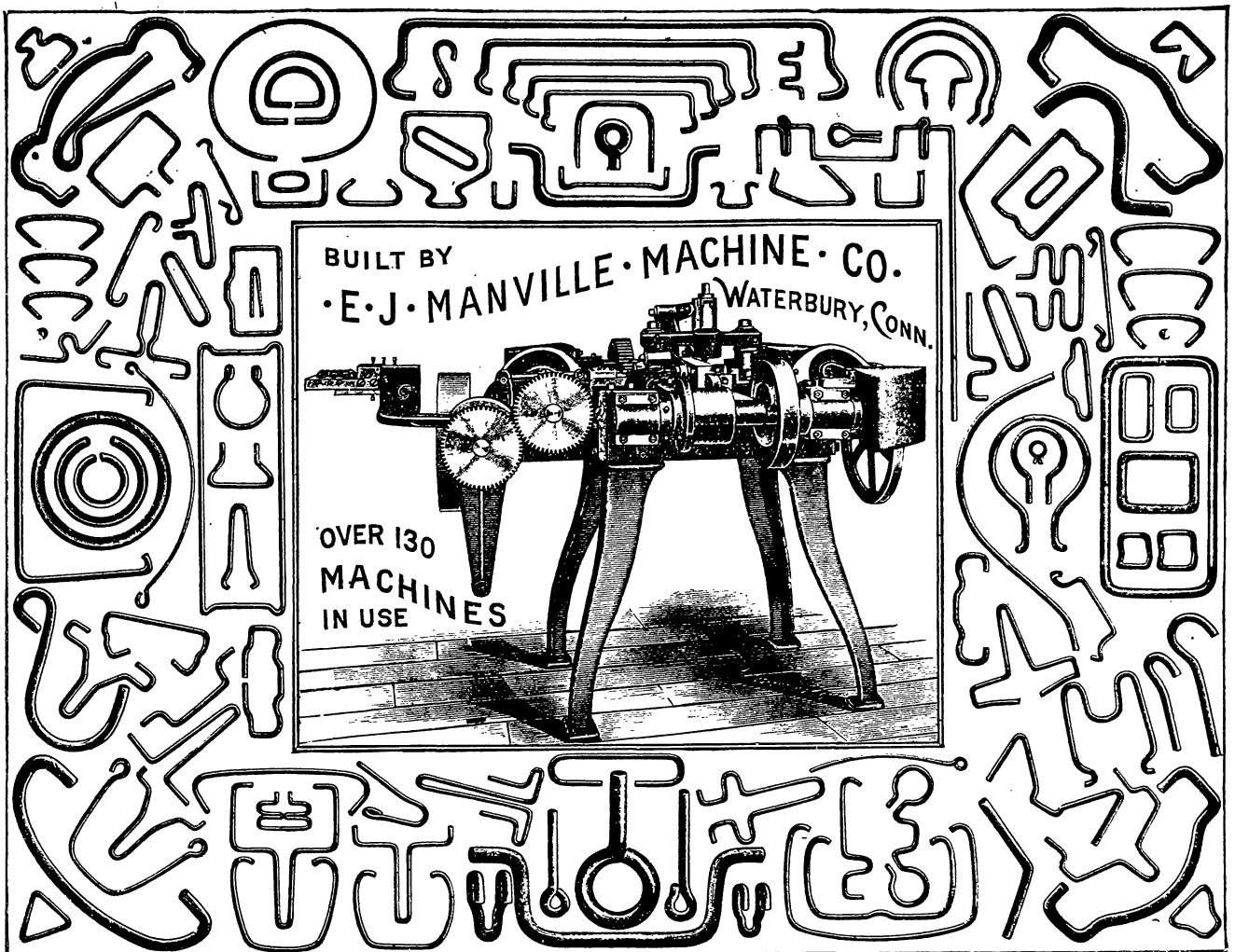
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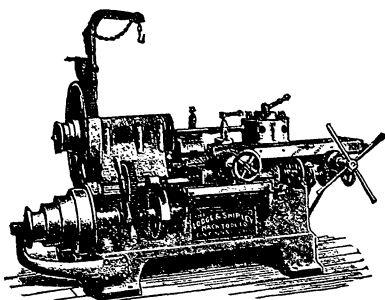
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 BOILER SHOP OUTFIT COMPLETE.

Boiler Rolls 49 in. between Housings; Boiler Clamps; Punch, 35 in. Throat; Punch and Shear, 21 in. Throat; Beveling Shear; Hor. Flange Punch, H. & J., No. 1.
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9 1/2 in. x 20 ft. Geared Face Plate. 88 in. Driving Wheel Lathe, 2 Tool Carriages.
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 Milling Machines, Screw Machines, Gang Drills.
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50 H.-P. Vertical, 13 in. x 18 in. N. Y. S. S. P. Co.
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16 in. x 30 in. Horizontal Engine.
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19½ in. x 48 in. Beam Engine, with Knowles Condenser.

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One Belden 100-lb. Upright Power Hammer.
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40 tons 40 pound Iron T's.
300 tons 40 pound Steel T's.
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4 tons 16 pound Steel T's.
These Rails are all in first class condition for relaying, and will be sold very low.

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1000 light Mather Dynamo.
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1 16 in. x 6 ft. Perkins Lathe.
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1 18 in. x 8 ft. New Haven Lathe.
1 18 in. x 8 ft. Dustin Lathe.
2 20 in. x 6 ft. Bullard Lathes.
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2 20 in. x 8 ft. Bullard.
1 20 in. x 10 ft. Bullard.
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Corliss Engines, 10 x 20; 16 x 42; 23 x 36; 26 x 44; 28 x 60; 30 x 60; 30 x 72. Also Porter-Allen, 14 x 30; 11 x 16; Slide Valve, Back Valve, Cut-off 18 x 36; Slide Valve, 16 x 48; 16 x 36; 14 x 24: an assortment of Steam Pumps, 100 gal. Steam Fire Pump, Bogardus Mill, Simpson Crusher, Brennan Crusher, Ingersoll Rock Drill 30 in. Burr Stone Mill, 8 and 9 ft. Fan Blowers, Platform Scales. Four Side Wood Planer and Matcher, &c., &c.; 4 Rendering Tanks, Round, Square and Jacket Tanks. Send for catalogue.

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We have on hand
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Send for descriptive catalogue of Hooker Pumping Machinery.

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To furnish reasonable estimates on specialties in light metal work.
 CLARK & COWLES, Plainville, Conn.,
 Manufacturers of Clock Trimmings, Rivets, Springs, &c.

Manufacturers,
 Inventors,
 Anyone,—

Our methods are new.
 Are you dissatisfied
 with present results?
 Do you want bigger
 profits? Write to us.

Anything you want
 made, write us. We
 astonish the trade with
 delicate or difficult
 parts. Our novelty
 work is unequalled.
 THE H. H. FRANK-
 LIN MFG CO., Syra-
 cuse, N. Y.

HELP WANTED.

*Undisplayed Advertisements for
 Help Wanted not exceeding fifty
 words One Dollar each insertion.
 Additional words two cents each.*

SALESMAN in every large town to sell a staple line of hardware on commission. Address "EDWARDS," care E. S. Adams, office of *The Iron Age*, 312 The Cuyahoga, Cleveland, Ohio.

COMPETENT FOREMAN, in wrought iron and wire factory; must be experienced in all its branches; give references and salary expected. Address "WIRE AND IRON WORKER," office of *The Iron Age*, Bank of Commerce Building, St. Louis.

SITUATIONS WANTED.

*Undisplayed Advertisements for
 Situations Wanted not exceeding fifty
 words Fifty Cents each insertion.
 Additional words one cent each.*

BY A MAN who has had 14 years' experience as manager in a large retail hardware and implement house in the Southwest, as salesman or manager in a similar house; would accept a position as traveler, should the trade in territory allotted justify. Address "H. and I.," Box 1012, office of *The Iron Age*, 96-102 Reade Street, New York.

BY A PRACTICAL Rolling Mill Man of experience and ability, as manager; is thoroughly competent and reliable; engaged now with a large concern who are going out of business. Address "MANAGER," No. 1012, office of *The Iron Age*, 96-102 Reade St., New York.

HARDWARE AGENCY.—Gentleman having 20 years' experience and established trade, with large hardware jobbing house and retailers, desires to represent manufacturers of staple lines of hardware and kindred goods with headquarters in Chicago. Address "AGENCY," office of *The Iron Age*, 59 Dearborn St., Chicago.

AS FOREMAN of iron foundry; 14 years' experience as foreman; light or heavy castings in green or dry sand; best of references. Address "LIGHT OR HEAVY," office of *The Iron Age*, 96-102 Reade St., New York.

AS MECHANICAL ENGINEER or Superintendent; has made a specialty of design and construction of heavy hydraulic machinery; has designed and superintended the erection of some of the largest hydraulic forging plants in this country; also familiar with modern bridge plants and their machinery; the very best of references. "ENGINEER OR SUPT.," office of *The Iron Age*, 96 102 Reade St., N. Y.

BY A YOUNG MAN of ability and push, with large wholesale hardware house; has had three years' practical experience in heavy and shelf hardware and builders' supplies; references from former employer; would like to engage by the 1st of November. Address "PUSH," No. 1012, office of *The Iron Age*, 96-102 Reade St., New York.

BY A MAN, who has had years of experience as superintendent and manager of both iron and steel mills, a position as superintendent or assistant; will work for a moderate salary; best of references; am a good draftsman and can furnish drawings and working plans for new mill; have built several from ground up. Address "NEW MILL," office of *The Iron Age*, 96-102 Reade St., New York.

BY A MECHANICAL ENGINEER; first-class draftsman with wide experience in England and America in hydraulic and general engineering; excellent references. Address "A. L.," Box 1012, office of *The Iron Age*, 96-102 Reade St., New York.

BY A CHEMIST; graduated last June from one of the leading Eastern Colleges; will work in any technical line; has had practical experience in blast furnace work; the best of references can be furnished. Address "GRADUATE," No. 1012, office of *The Iron Age*, 96-102 Reade St., New York.

BY A GUIDE MILL ROLLER of wide experience; can furnish best of references as to ability and sobriety. Address "S. A. H.," office of *The Iron Age*, 96-102 Reade St., New York.

BY A THOROUGHLY Practical Sheet Mill Manager of many years' experience; good references. Address "CASTLE," office of *The Iron Age*, 96-102 Reade St., New York.

BOOKKEEPER—A young man, 38 years of age, with 20 years' experience as manager and bookkeeper, desires a position where ability is necessary; is well versed in the iron business; am able financier and a thorough accountant and will furnish the best of references; willing to go to city or country. Address "BOOKKEEPER," office of *The Iron Age*, 220 So. 4th St., Philadelphia, Pa.

FOREMAN.—By an experienced setter and finisher on architectural iron work; have had charge of important work in New York and elsewhere, attending to laying out the work and erecting; strictly sober and have good references. Address "S. and F.," Box 1012, office of *The Iron Age*, 96-102 Reade St., New York.

GENERAL FOREMAN.—Would like to hear of an opening as such in some large manufacturing concern, in any locality, that are in need of a good mechanic and a hustler of experience to manage help and shop economically; any class of manufacture; good references. Address "GENERAL FOREMAN," office of *The Iron Age*, 96-102 Reade St., New York.

A GENTLEMAN, 31 years of age, who, during the last five years, has been connected as secretary, financial and business manager with one of the largest iron mining and furnace concerns in the country, and who is personally well acquainted with the leading houses in the different branches of the iron business, as well as with financial men East and West, desires to associate himself with parties of means and enterprise, or he will accept, with a view of obtaining an interest, an executive position with a first-class concern, which is able to appreciate sound business judgment, enterprise and executive ability. Only offers of a high order will be considered. Please address "153 J. A.," office of *The Iron Age*, 96-102 Reade St., N. Y.

BY AN EXPERIENCED SALESMAN and Traveler; familiar with the manufacture and sale of seamless boilers for kitchen ranges, and seamless tubes, and controlling valuable patents connected with the manufacture of same. Address, for two weeks, "TUBES," Box 95, office of *The Iron Age*, 96-102 Reade St., New York.

MAN of practical and commercial experience in hardware, cutlery, notion and electrical work desires engagement in a responsible position; highest references. Box 2268, General Post Office, New York City.

AS TRAVELING SALESMAN for a good iron or steel works; have a practical knowledge both in the manufacture and sale of iron and steel, having had 25 years' experience in mills and on the road; well acquainted with the trade; can furnish the best of references. Address "J. D.," office of *The Iron Age*, 509-510 Hamilton Building, Pittsburgh, Pa.

WOULD LIKE to associate myself with some large manufacturer of hardware or commission hardware house as salesman or house position; have been on the road for the last six years, and can furnish all references. Address "HARDWARE," P. O. Box 182, Baltimore, Md.

AS MANAGER or foreman of a wire mill; have a thorough and practical knowledge of the wire trade in all its branches; twenty-five years' experience, twelve years as foreman; have charge of a large mill at present; am a good all-round mechanic, understanding the working of wire mill machinery and the building of annealing furnaces, bluing ovens, &c.; am strictly temperate and can furnish the best of recommendations from past and present employers; firms desiring a man that knows how to practice economy and run a mill on business principles will find it to their advantage to correspond with me. Address "TEMPERED STEEL WIRE," office of *The Iron Age*, 220 So. 4th St., Philadelphia.

BY A MIDDLE AGED married man; has had many years' experience as bookkeeper, special accountant, keeping cost sheets, etc., of the various articles manufactured in machine shop, boiler shop, foundry and wire mill work; thoroughly understands business, clerically, in all details. Address "CLERICAL," office of *The Iron Age*, 59 Dearborn St., Chicago.

RESPONSIBLE POSITION by a graduated chemist and engineer in steel works or furnace plants; reference President Midland Blast Furnace Co. Address C. W. Kolbe, Midland, Mo.

BY A MECHANICAL ENGINEER, first-class draftsman, graduate from the German Polytechnic High School as Government machine engineer, with two years' practical experience; secured highest award for competitive work in the construction of modern derricks. Address D. Kops, 500 Broadway, New York City.

BY A GUIDE MILL ROLLER; have had 8 years' experience in guide mill rolling on all sorts of small iron and steel; am strictly temperate, and can give good references as to ability and character. Address "GUIDE MILL," office of *The Iron Age*, 96-102 Reade St., N. Y.

A WELL KNOWN and successful Blast Furnace Superintendent or Founder will be open for engagement after Oct. 1st, 1893. Is thoroughly competent as constructor or in the management. Practical, theoretical and in touch with latest improvements in blast furnace practice. First-class record and references. Address "BLAST FURNACE, No. 921," office of *The Iron Age*, 96-102 Reade St., New York.

BY A MEMBER of the A. S. M. E., expert in shop management and economical production of machinery, as superintendent or manager; well posted on dynamical, hydraulic and mechanical engineering and inspection of materials. Address "W. O. W.," office of *The Iron Age*, 96-102 Reade St., New York.

ANY EASTERN MANUFACTURING CO. wanting a good man of experience in steam engines and general machinery, thoroughly trained in office work, practical draftsman, having well developed general business ideas, clean cut appearance and address, with honest determination to do his best, address Mr. Jno. T. Dreyff, office of *The Iron Age*, Room 509, Hamilton Building, Pittsburgh, Pa. I can hustle mentally and physically.

THE STEEL AND IRON IMPROVEMENT CO.,

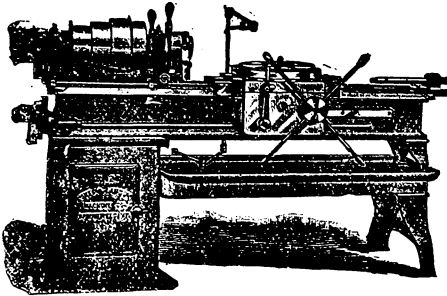
Controlling the Adams-Blair Process and other Steel and Iron Patents.

High Grade Open Hearth Steel produced by the Adams-Blair Process at less than the Cost of BESSEMER Steel.

91 and 98 Fifth Ave., Pittsburgh, Pa.

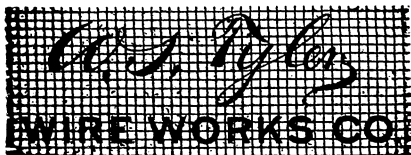
EASTERN OFFICE: 412 Drexel Building, Philadelphia, Pa.

2 BY 24 FLAT TURRET LATHE.



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Jones & Lamson Machine Co.,
SPRINGFIELD, VERMONT, U. S. A.



MANUFACTURERS OF

Extra Heavy Double Crimped Wire Cloth
FOR STAMP BATTERIES.

Steel, Iron, Brass and Copper Cloth for Coal and Ore
Screens, Flour Mills, Paper Mills and Maltsters

W. S. TYLER, Pres. PROCTOR PATTERSON Sec. & Treas.
CLEVELAND, OHIO.

ANALYTICAL AND ASSAY **LABORATORIES**

—OF—

DR. GIDEON E. MOORE

221 PEARL ST., (Corner Platt St.,) NEW YORK.

Assays of Ores, Metals and Metallurgical Products of every description.
Analysis of Water, Ores, Minerals, Metals, Fuel, and Natural and Industrial Products generally.

PRINTED PRICE-LIST ON APPLICATION.

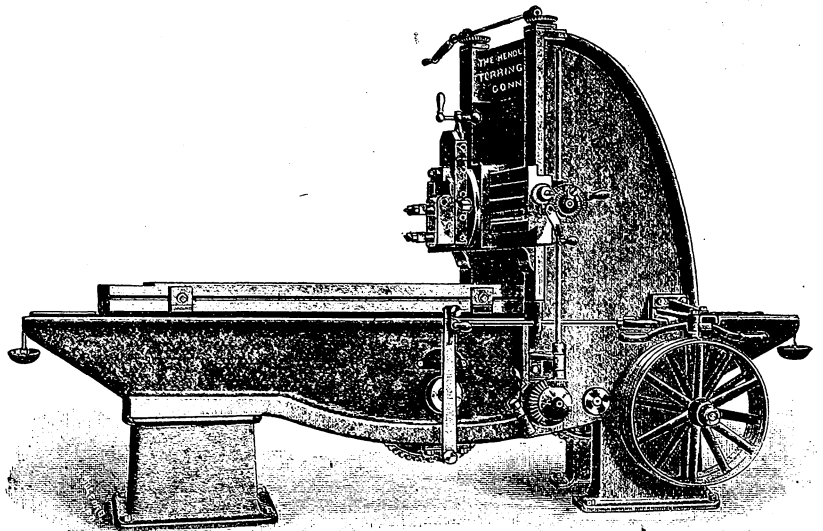
ALUMINUM.

The Pittsburgh Reduction Co.,

116 Water St., Pittsburgh, Pa.,

Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

**ALUMINUM SHEET, WIRE,
AND CASTINGS.**



Iron Planers at Reduced Prices.

We have on hand a few new planers of this pattern, and in order to dispose of them quickly, we would make a good reduction in price of same. The sizes are 16 inch, 22 inch, 24 inch and 27 inch. If you are in need of a good planer write us for prices on these.

The Hendey Machine Co., Torrington, Conn.

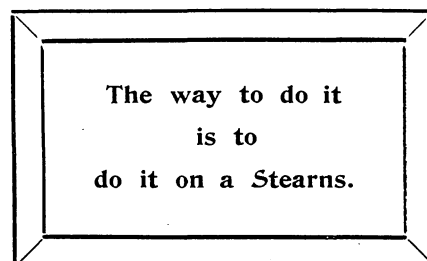
DO YOU NEED

SPECIAL MACHINERY.

CORRESPOND WITH

THE NEWARK MACHINE TOOL WORKS,
NEWARK, N. J.

THE STEARNS BICYCLES.



The way to do it
is to
do it on a Stearns.

E. C. STEARNS & CO.,

Syracuse, N. Y.

ARE YOU HERE TO MAKE MONEY?

IF SO, THE PRICES WE ARE MAKING ON
OIL HEATERS AND GAS STOVES
WILL INTEREST YOU.

B. & B. Stoves are the Leaders.

B. & B. Combination Oil Heaters and Cook Stoves are a great success, as proven by the many testimonials received from all parts of the country.

Every Stove is mounted on rollers, and can easily be moved from room to room. They can be used in place of a range in the kitchen or in place of a base-burner in the parlor. They are thoroughly well adapted to fill all requirements, combining as they do all the qualities of a first-class Oil Heater and an elegant Parlor Cook Stove.

If you happen to have one of them upstairs, the tank can easily be removed and taken down to the kitchen to be filled, and again replaced in the Stove.

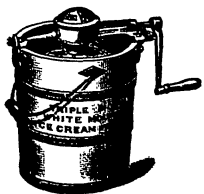
Those who have used the old style Stove with tanks fastened in them as tight as if cast in the iron will appreciate this feature. They can be fitted with our 2-hole, 3-hole or 4-hole Extension Tops for regular 8-inch ware. We want your trade, and if you will give us a chance to quote you prices we will have it.



ASK FOR OUR NEW 80-PAGE CATALOGUE.

W. W. MONTAGUE & CO., San Francisco, General Agents for the Pacific Coast.

The Glazier Stove Co., Mfrs., CHELSEA, MICH.



The standard by which the merits of a Freezer are gauged is, how near it comes to being as perfect as the

WHITE MOUNTAIN ICE CREAM FREEZER.

It always has been, and is still, the best. Try them.

Manufactured by The White Mountain Freezer Co., Nashua, N. H.



THE OLD RELIABLE STANDARD FREEZER

has the reputation of being the BEST ICE CREAM FREEZER ever introduced. STRENGTH, DURABILITY, NEATNESS AND EFFICIENCY are prominent points in the manufacture. Full Size Can, CEDAR TUB, Detachable Hinged Crossbar, Self-adjusting Vibratory Scraper, etc.

Write for Illustrated Circular, Price-List and Discounts of STANDARD, GOOD LUCK, MODEL and MACHINE Freezers.

CHAS. W. PACKER, Mfr.,
20 North Fourth Street, Philadelphia.

THE "New" Keystone Beater,

No. 20 for Family Use.

JAR ENTIRELY COVERED.

No more Spattering.

CAN BE USED ANYWHERE.

Standing or Sitting.

ALWAYS READY FOR USE.

Nothing to be fixed.

SIMPLY PERFECT.

No. 20.—Jar holds 1 quart level full.
Complete Machine securely packed in one single package.
½ dozen packed in case.

MANUFACTURED ONLY BY

NORTH BROS. MFG. CO.,

Manufacturers of Hardware Specialties for Household use
American St. and Lehigh Ave., Philadelphia, Pa., U. S. A.



FOR
WHIPPING
AND
BEATING
EGGS.
MIXING
BATTERS, DRINKS,
SAUCES, ICINGS,
POWDERS, ETC.
CREAMING
MELLOW FRUITS,
BANANAS, PEACHES,
BERRIES,
BUTTER & SUGAR.



Discounts to Dealers.
BARGAINS IN BICYCLES.
Write for latest list and catalogue free. My 1 p. h. Overlands and Budgets of our own manufacture on favorable terms to the trade; Western Wheel Works' Cycles of which we are largest Western jobbers at Bed-Rock prices. Positively 20 to 80% saved on many styles. The low prices and high quality of our goods will surprise you. Don't miss it. Write now. Cycles sold on easy payments.
ROUSE, HAZARD & CO., 146 G St., Peoria, Ill.
Manufacturers, oldest and largest jobbers in U. S.

COVERT'S SELF-LOCKING, GATE AND DOOR HOOK.
POSITIVELY PREVENTS BEING UNHOOKED FROM THE OPPOSITE SIDE THROUGH CRACK OR NARROW OPENING
MADE IN TWO SIZES
4 AND 6 INCH XC PLATED.
SAMPLE BY MAIL 15¢

Call for Our Banner Bolt Snap:

This snap has many important advantages over other makes of Bolt Snaps, viz.: It is lighter, the spring is entirely covered and protected from foreign substance and freezing, and is lower in price.
Made in all sizes; Round, Loop and Open Eye. We are headquarters and the most extensive manufacturers in Saddlery, Coach and General Hardware Specialties.

Covert's Saddlery Works,

FARMER, N. Y., U. S. A.



CROWN and GIANT BRAIDED

Sash Cords, Bell Cords, Mason's Lines, Clothes Lines, Bright Wire Goods, Picture Wire Nails, Hooks and Hooks, Brass Chain, Spool Wire, Etc.

OSSAWAN MILLS CO.,

Norwich, Conn., U. S. A.

**Hardware Dealers
Can Profitably
SELL BICYCLES.**

There is a large trade in Bicycles in all parts of the country and much of that trade naturally belongs to dealers in hardware. Good bicycles meet with a ready sale and pay a fair percentage of profit.

COLUMBIAS

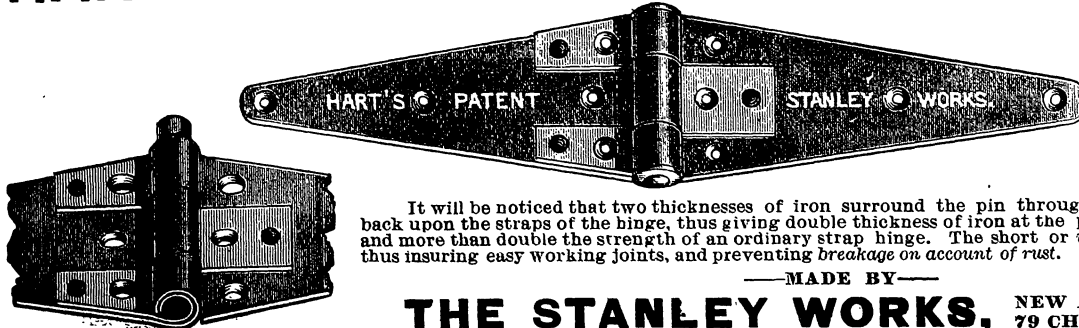
Are the representative high grade machines in America. A Columbia is the easiest machine to sell to the best trade because it is unquestionably the standard wheel of the world.

We want enterprising agents of good standing and solicit correspondence.

Pope Mfg. Co.,

221 Columbus Ave.,
Boston, Mass.

HART'S PATENT HEAVY STRAP HINGES.



It will be noticed that two thicknesses of iron surround the pin throughout its length and extend back upon the straps of the hinge, thus giving double thickness of iron at the points where most needed and more than double the strength of an ordinary strap hinge. The short or inside leaves are galvanized thus insuring easy working joints, and preventing breakage on account of rust.

—MADE BY—

THE STANLEY WORKS, NEW BRITAIN, CONN.
79 CHAMBERS ST., N. Y.

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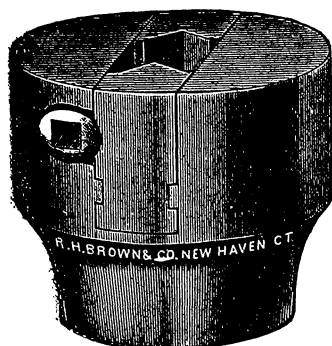
REID DRILL CHUCKS.

THREE SIZES.

No. 0 takes any drill from 0 to 1-2 inch inclusive.

No. 1 " " " " 0 " 3-4 " "

No. 2 " " " " 0 " 1 " "



They are the strongest and most durable made. Drill absolutely in the center. No twisting or bending necessary if drill is straight. Can be fitted to hollow spindle lathes for working long rods.

SEND FOR CIRCULAR.

R. H. BROWN & CO., - New Haven, Conn.

*You take no risk on the quality
We make only the best!*



**Sand
Papers**
IN
Reams and Roll

Flint Paper
Garnet Paper
Emery Paper
Emery Cloth

HAIR FELTING for covering Boilers, Steam and Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & CO.

730 MARKET STREET, PHILADELPHIA;
87 BECKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON;
102 LAKE STREET, CHICAGO

THE GEM SOLID STEEL MINCER

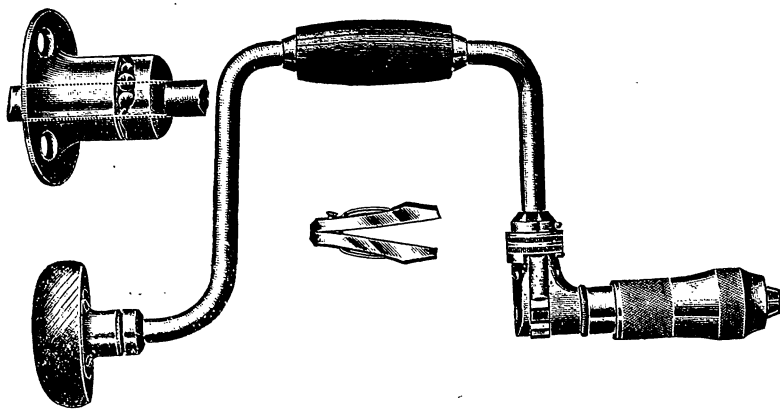


Single
and
Double Blades.

Handle and Blade Formed in one piece.
Always Clean. Indestructible.
No Rivets to Wear Loose.
No Wooden Handle to Shrink, Swell, Loosen,
Split, or Fill with Rancid Grease.

MANUFACTURED BY
PALMER HARDWARE MFG. CO.
TROY, N. Y.

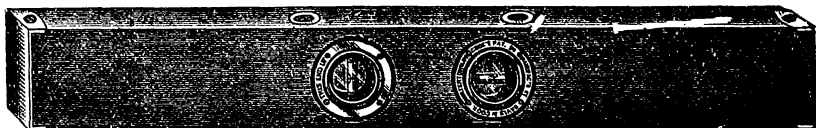
BARBER IMPROVED BRACE.



Instead of reducing the price of our braces to meet competition, we have from time to time increased the cost of making the goods. Our latest improvement is the use of Ball Bearings, as seen in the cut. These balls prevent all wear, and cause the head to turn without friction. It is probably the best improvement which has been put on braces for many years. This has been the leading brace in market for a long time and we intend to make it worthy of its reputation for a long time to come. All Hardware Dealers will furnish them.

MILLERS FALLS CO.,

93 READE STREET, - - - NEW YORK.

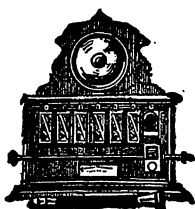


COOK'S PATENT LEVEL.

Made in Wood and Iron. Every Level Fully Guaranteed.
Inquire at your nearest hardware store for them. If not in stock, send to

TAKE NO
OTHER.

DAVIS & COOK
WATERTOWN, N. Y.

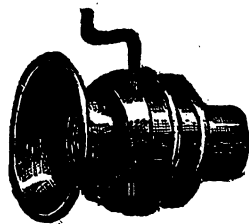


W. R. OSTRANDER & CO.,

204 FULTON STREET, NEW YORK,
Manufacturers of

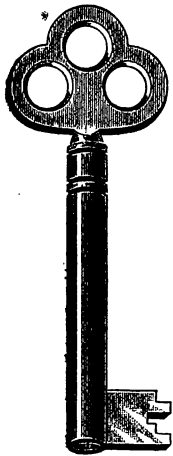
SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC
MECHANICAL AND PNEUMATIC ANNUNCIATORS
AND BELLS.

Complete outfits of Speaking Tubes, Whistles
Electric, Mechanical and Pneumatic Bells. A full line
always in stock. Send for new catalogue. Factory,
DeKalb ave. near Knickerbocker, Brooklyn, N. Y.

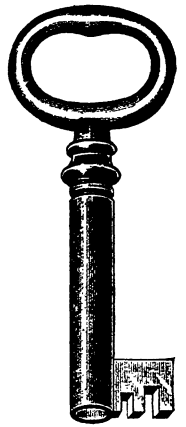


CABINET LOCKS

OF EVERY KIND.



DRAWER LOCKS,
CUPBOARD LOCKS,
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DESK LOCKS.



A complete line of more than 1000 list numbers exclusive of our old
and complete line of

YALE CABINET LOCKS.

THE YALE & TOWNE M'F'G CO.,

STAMFORD, CONNECTICUT.

New York. Chicago. Philadelphia. Boston. Pittsburg. San Francisco.

THE DEALER who sells what
THE PEOPLE ask for
MAKES FRIENDS and MONEY, and
SAVES TIME and TROUBLE.

The people ask for

**LePage's
Liquid
Glue,** And the people are right.

It is the strongest and best glue made. It has been
imitated, but never equalled. Be sure to get what you
order and ACCEPT NO SUBSTITUTES.

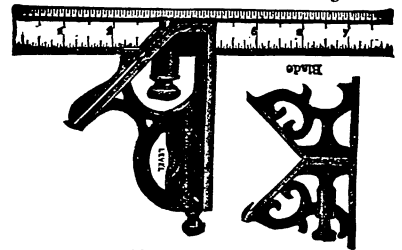
Our name is on every label

RUSSIA CEMENT CO.,

GLoucester, MASS.

New York Office, 95 Reade and 113 Chambers Streets.
Pacific Coast Office, 23 Davis Street, San Francisco, Cal.

CHAPLIN TRY AND CENTRE SQUARE.



Also a full line of

MACHINISTS' FINE TOOLS.

If you haven't our 1893 catalog send us a
postal card.

STANDARD TOOL CO.,

ATHOL, MASS., U. S. A.

ATHOL MACHINE CO., Selling Agents.

**NONPAREIL
Ratchet Wrenches.**



Made of best forged Tool Steel; are
easily and readily adjusted and controlled. Can be made reversible
instantly without removing from their
work by throwing over the lever in
slot of the handle.

The Set of Combination Tools No. 1
includes the wrench, two sockets, one
for screw-driver, bit or reamer shank,
with wood handle, and one socket

for drill shank and feed nut. The
jaws on this wrench open from 3-16
to 1 1/4 inches.

Send for Illustrated Circular
and Price-list of various sizes

The Keystone Mfg. Co.
312 Terrace, Buffalo, N. Y.

American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.



W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

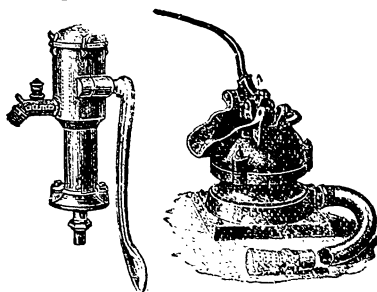
A LARGE CAPACITY AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 209.

Fig. 381.

Fig. 145.



or wherever it is desired to raise a large quantity of water by
hand power.

The pump has large valves (accessible by hand), and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

CAPACITY

from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.
Made either as shown in cut for Hose or for **IRON** Pipe Suction underneath.

Send for Circular and Price List.



C. I. Grindstone Frame.

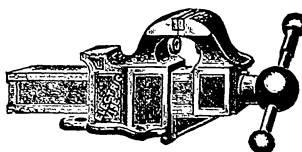
THE DEMING CO.
FACTORY
SALEM O.S.A.
MANUFACTURERS OF
HAND & POWER PUMPS, WELL SUPPLIES & C. VERTICAL STEAM PUMPING ENGINES.
N.Y. OFFICE
72 JOHN ST.
HENTON & HUBBELL
GEN'L WESTERN AGTS
55 & 57 N. CLINTON ST.
CHICAGO, ILL.

F.E. MYERS & BRO.

WORLD'S EXHIBITION
LIFT PUMPS
ASHLAND O.
+ CATALOGUES FREE +
Ashland Pump and Hay Tool Works.

The New York Safety Dumb Waiter,
"The Manhattan Dumb Waiter,"
"The Improved Humphrey Hand Elevator,"
Made specially to be sold by Hardware Stores. Thousands in use. Catalogues on application.
THE STORM MANUFACTURING CO.
NEWARK, NEW JERSEY.
Formerly of Poughkeepsie, New York.

VISE.

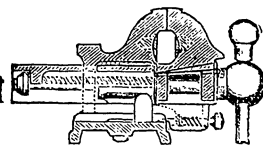


Patented Dec. 27, 1892.

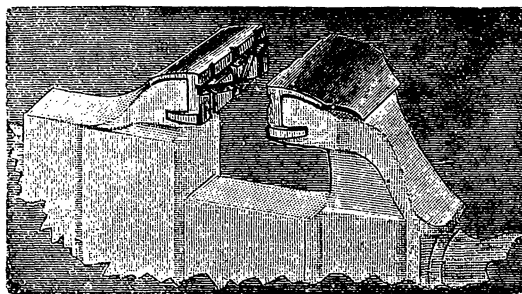
IT HAS QUALITIES THAT ARE
UNDISPUTED.

Rapid, Active, Prompt

One movement in and out, one turn of the hand and the work is secured.



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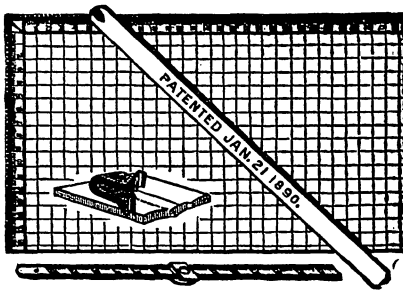
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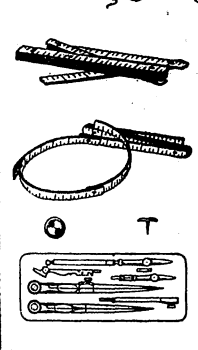
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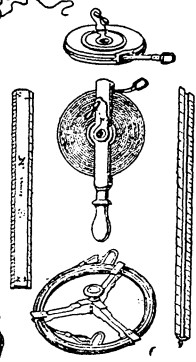
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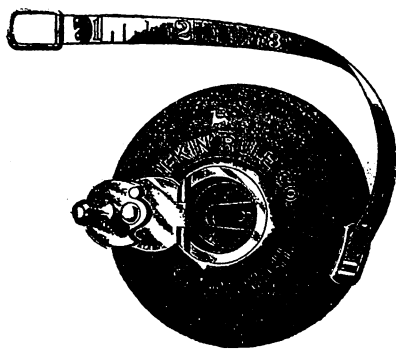
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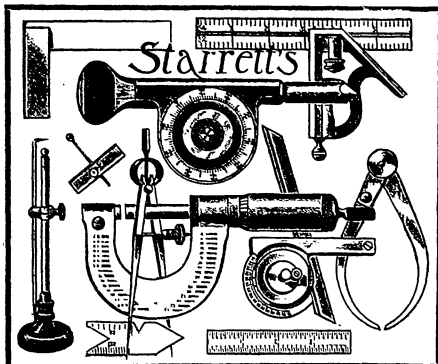
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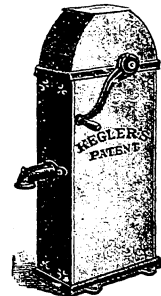
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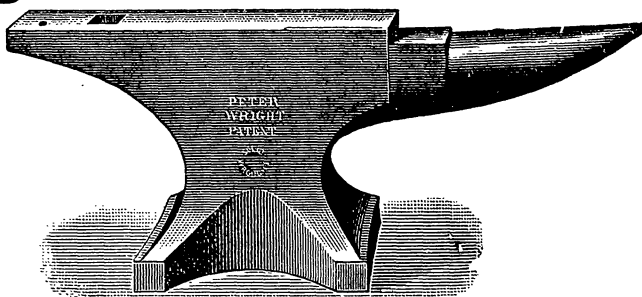
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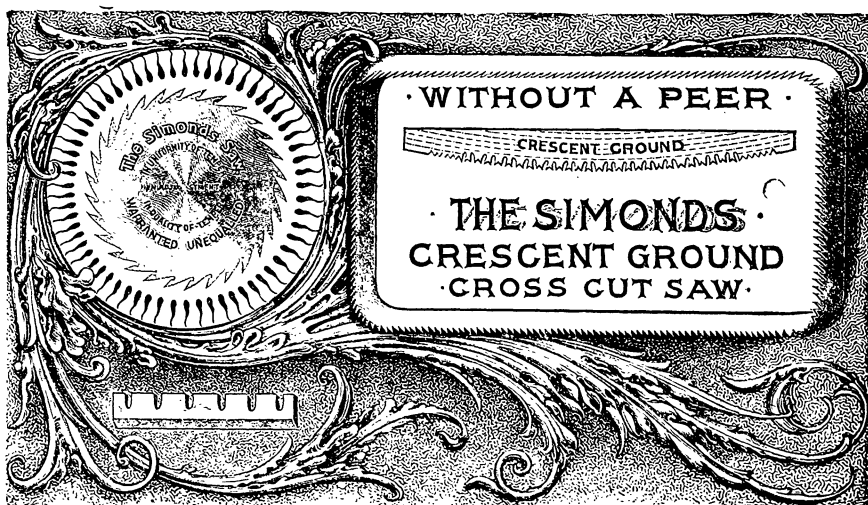
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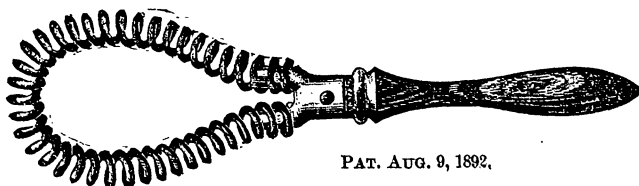
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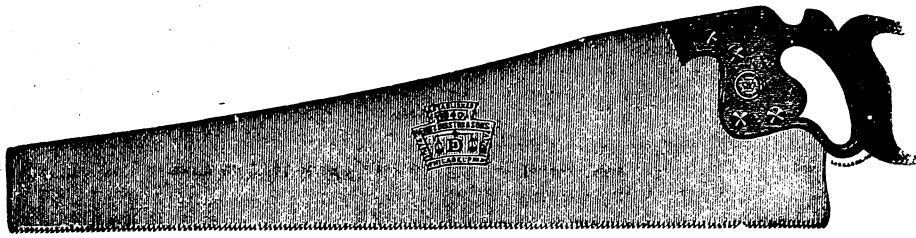
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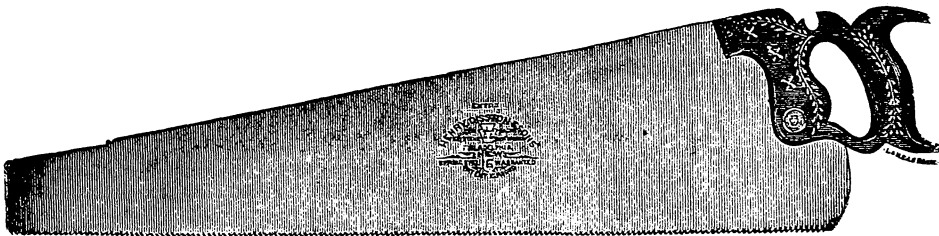
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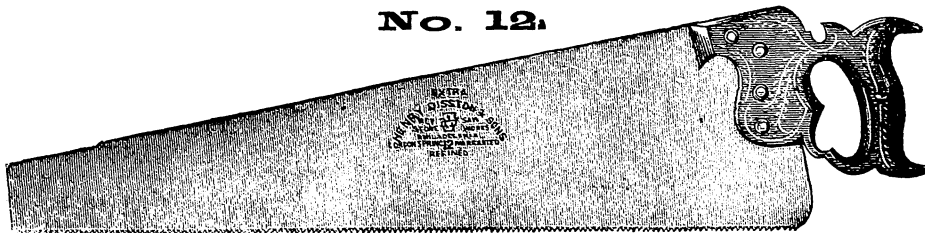
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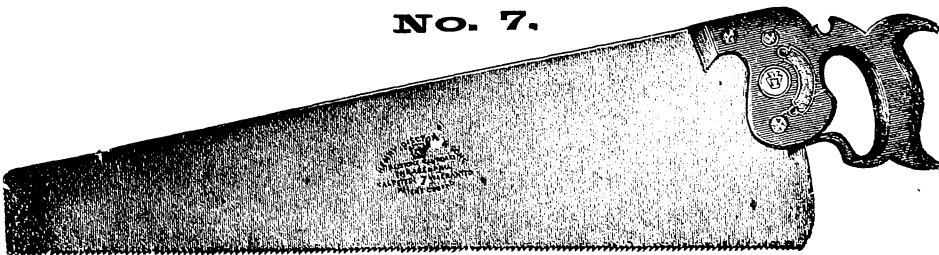
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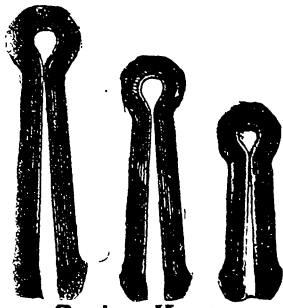
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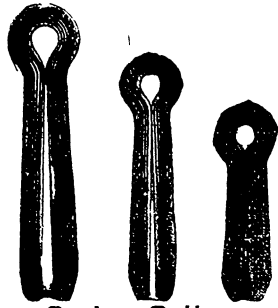
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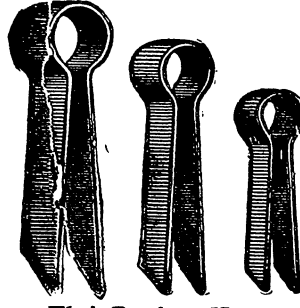
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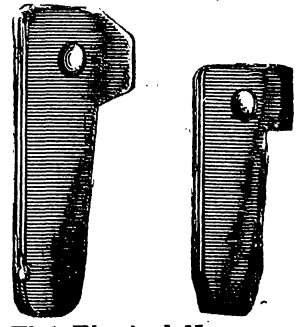
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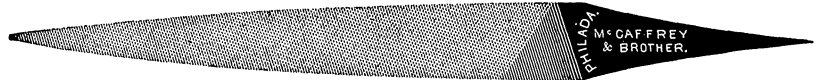


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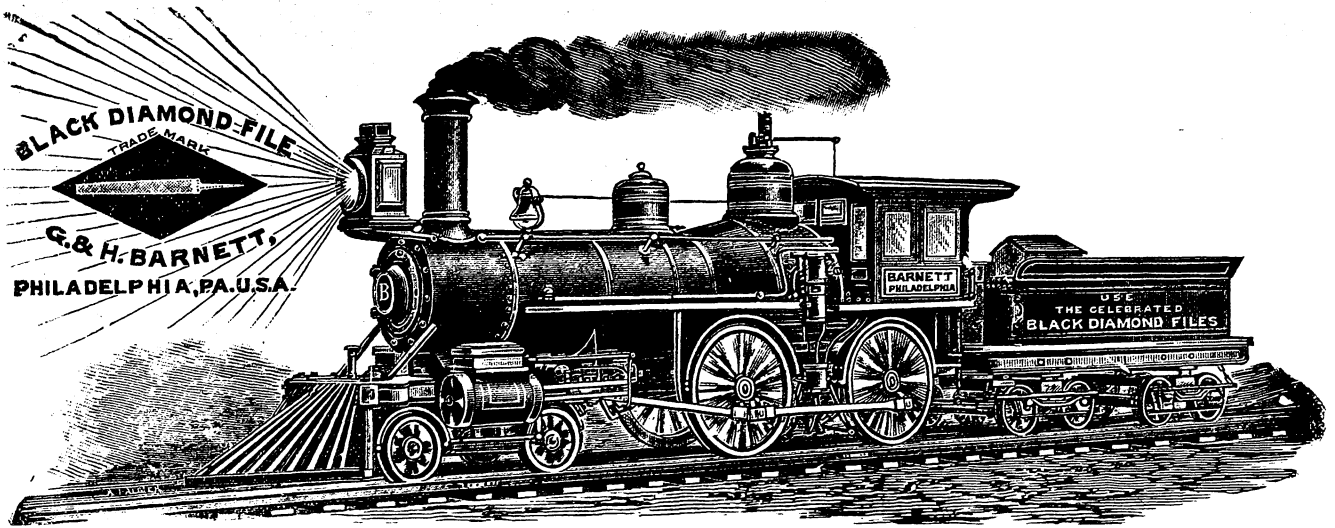
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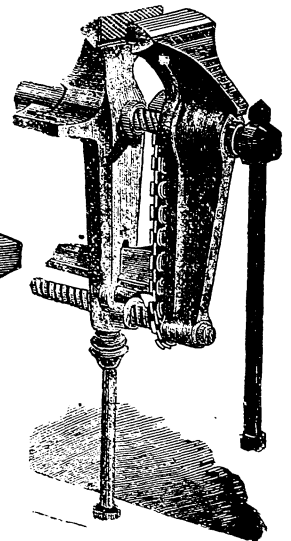
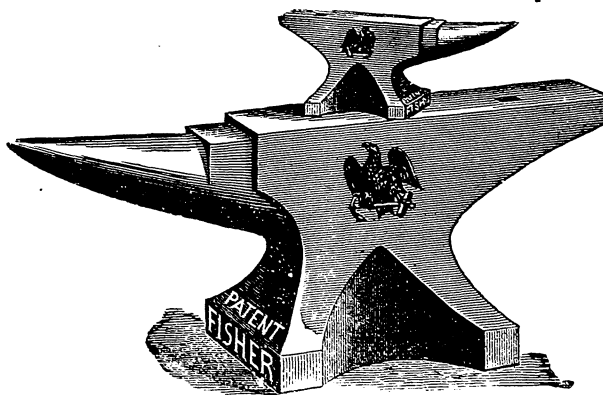
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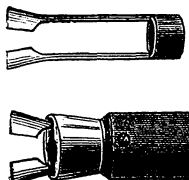


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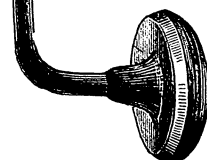
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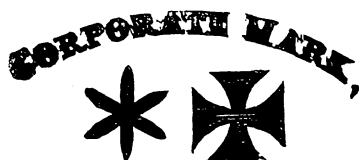
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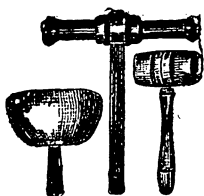
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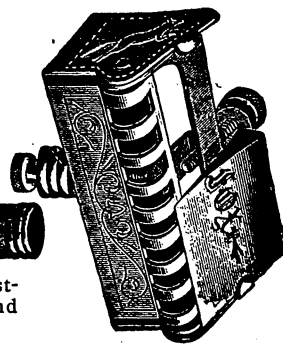
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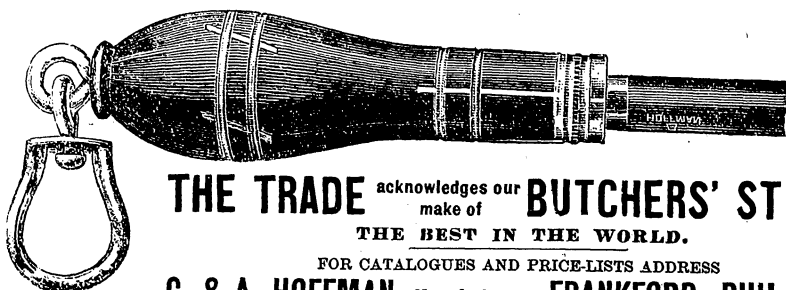
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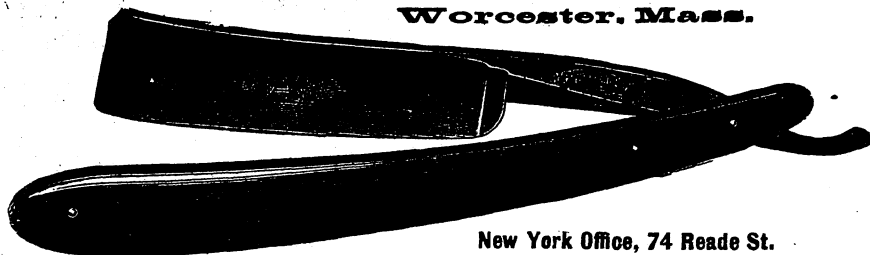
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CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark also, "Riverlin Works."

Established 1825.

Incorporated 1892.

R. HEINISCH'S SONS CO.,

NEWARK, N. J., U. S. A.

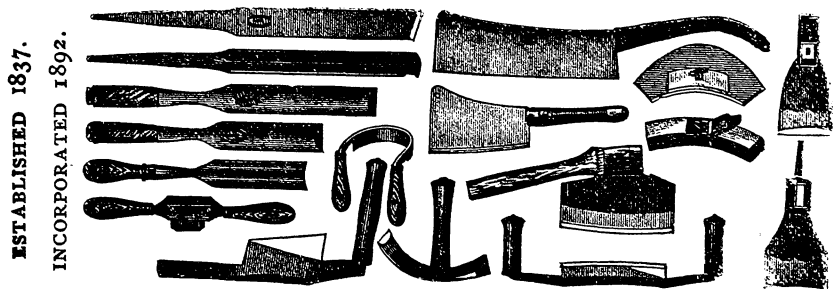
New York office, No. 90 Chambers St.

Tailors' Shears, Trimmers, Scissors, Tinnerns' Snips, etc.

CATALOGUES AND PRICES ON APPLICATION.

**WE HAVE NO CONTRACT WITH
MESSRS. HERMANN BOKER & CO. AS
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HIGHEST AWARD PARIS EXPOSITION, 1889.



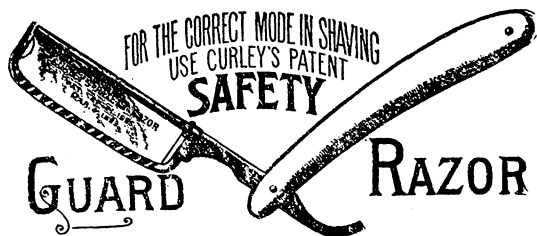
THE L. & I. J. WHITE CO.

MANUFACTURERS

OF EDGE TOOLS.

BUFFALO, N. Y.

Coopers', Carpenters' and Ship Tools, Plane Irons, Cleavers, &c. Full Line Chisels.



THIS improvement permits CORRECT SHAVING, therefore no irritation is caused, and the most inexperienced can shave with perfect safety.

We also carry the largest line in the United States of CUTLERY of every description.

J. CURLEY & BROTHER,

6 WARREN STREET, - - NEW YORK.

Cast Shears.

ACME SHEAR CO.,

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MARTEN DOSCHER,**Commission Hardware,**

88 Chambers St., New York.

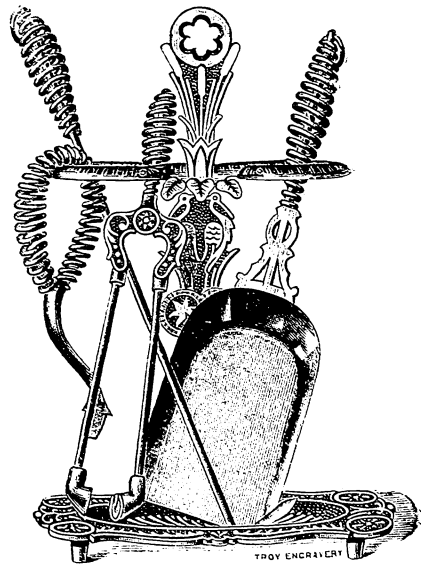
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ALASKA.

ALWAYS COLD.

Stove Trimmings.

Pokers, Lifters, Shovels, Fire Sets.



For Sale by All

First-class Jobbers in Hardware.

Made under Gaitly Patents and only by

Troy Nickel Works,

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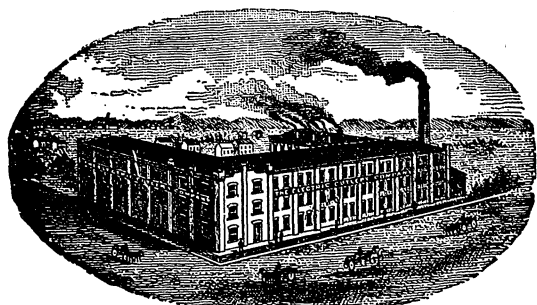
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Canadian Sales Agents.**WHEN IN WANT OF
WOSTENHOLM'S****I★XL****Knives or Razors,**

SEND TO

FRED. B. GURNEY

116 Chambers St., N. Y.

The Best Equipped Cutlery Works in the World.



FACTORY: FOURTH & DICKERSON STS. NEWARK, N. J.

THE ELECTRIC CUTLERY CO.,

113 Chambers St., N. Y., and Newark, N. J.

Manufacturers of Razors, Knives
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NEW YORK

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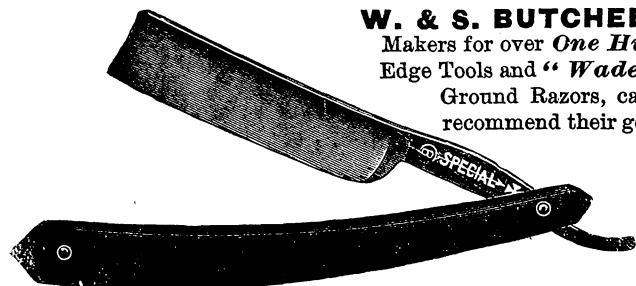
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TABLE CUTLERY, BUTCHERS' CARVERS, PLATED GOODS, &c.

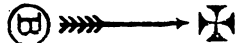
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W. & S. BUTCHER, Sheffield, England, and 135 Duane St., New York
Makers for over *One Hundred Years* of the celebrated "*W. Butcher*" Files and
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Brand as being the most perfect *Extra Hollow Ground*
Razors ever manufactured and especially suited for the use of
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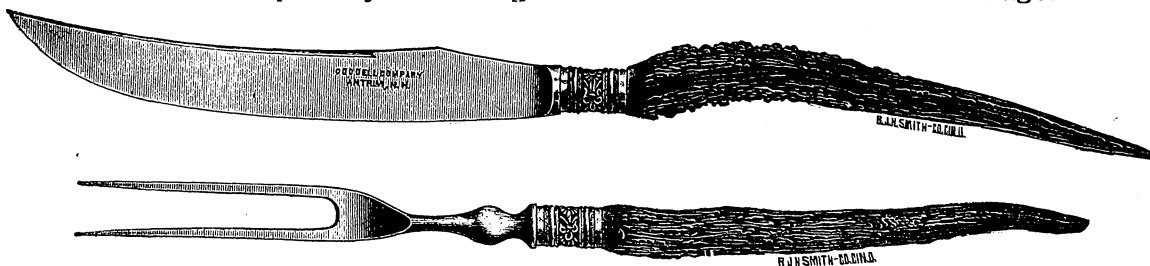


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HOW IS YOUR STOCK OF CARVERS.

We make a specialty of Carving Knives that will take and hold an edge.



Most any man will pay a fair price for a pair of Carvers, but he wants good ones. Buy Goodell's and you can give him what he wants,
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ter Spades, Butcher Steels, &c., &c.

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Manufacturer of



Main Office and Works

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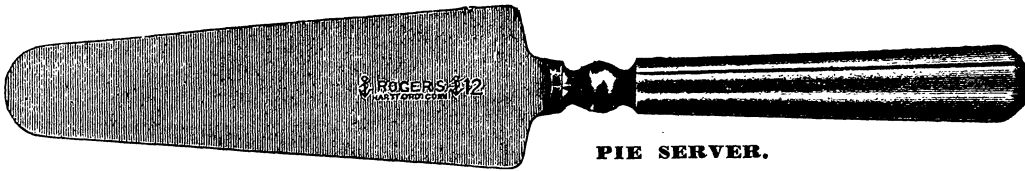
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Philadelphia, Pa., U. S. A

—NONE BETTER—
THAN THE



SILVER PLATED WARE.



PIE SERVER.

MANUFACTURED BY

THE Wm. ROGERS MFG. Co.,

Office and Factory, HARTFORD, CONN. P. O. Drawer 30.

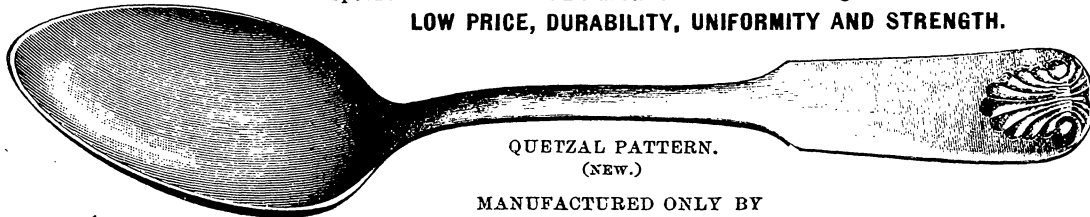
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AZTEC COIN METAL

MADE INTO SPOONS AND FORKS.

Spoons and Forks of this metal combine all the following desirable features:

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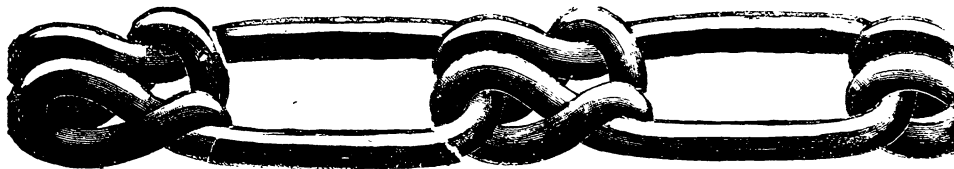


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(NEW.)

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THE HOLMES & EDWARDS SILVER CO.,

Bridgeport, Conn.



outs, Kennel Chains, &c.; also cut to lengths for manufacturers' use.

The cut represents the exact size of 6/0.

Thirteen Sizes made, 6/0 being the Largest.

The Bridgeport Chain Co.'s Triumph

Chain, made into Halters

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FACTORY AT

BRIDGEPORT, CONN.

"SHUT DOWN ! What's the Matter ?"

"BELT BROKE AGAIN!"

"See here, Mr. Foreman, if you don't have fewer stoppages I'll—"
 "Stop, Mr. Proprietor, the fault is yours. Quit buying belts that crack, peel, open between plies, stretch and break, and I'll give you a smooth run. You think it economy to buy cheap belts from Worthless & Co. Why! the time lost and trouble and annoyance caused by shut-downs would pay the difference between good and bad belts ten times over. Why don't you buy Cleveland's 'Shield High Grade,' sold by Reliable & Co.? It has an established reputation, has been thoroughly tested, and is in use in all the large mills and elevators here. You take no chances on it. Besides, a strong warrantee is indelibly branded upon it, such as no manufacturer would dare put on a poor belt. You remember that threshing machineman, whose engine we repaired, said he had a Cleveland High Grade Belt in use over five years, and if it will stand such severe work, it certainly will ours."



Trade

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LABEL INDELIBLY STAMPED ON
EVERY 30 FEET OF BELT.

GUARANTEE.

We Guarantee our "Shield High Grade" Belt to be made of best long staple, 30 & 32-oz. cotton duck; To be the most durable, because it is made of best materials, by special machinery; To be the best selling belt, because it has the best reputation, a cleaner record of long service, and because its warrantee is stronger, bolder, broader than any other, and is irrevocable, protecting both dealer and consumer. We further guarantee that should any belt, under fair and reasonable service, fail or give out from any defect in material or manufacture, to replace same free of charge, on return to us.

Witness our hand and seal.

Cleveland Rubber Works

Of the Mechanical Rubber Co.

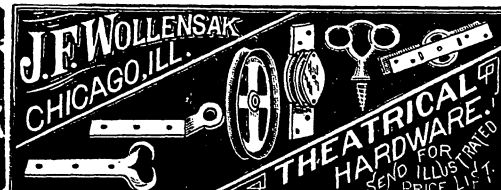
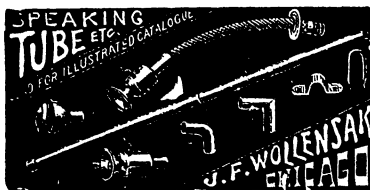


We are the only manufacturers who indelibly stamp a warrantee on each and every belt (see copy of label) and it remains as long as the belt lasts; and who give a written guarantee (see fac-simile). Our threshing machine belts have made a wonderful record, and our endless belts have given splendid service, the splice being as strong as the solid part of the belt. Suction Hose for Portable Engines and all other purposes.

We Want Your Trade.
 Send for 60-page Catalog.
 Write for Prices and Samples.

CLEVELAND RUBBER WORKS

OF THE MECHANICAL RUBBER CO., CLEVELAND, OHIO.



JESSE JONES & CO.,

**HARDWARE
SHELF BOXES**

Made of Wood.
No screws or
nails used to work
out and cut
your shelving.

615 & 617 Commerce St., Phila.

Send for circular and list of references.

Samuel W. Allerton, Pres.

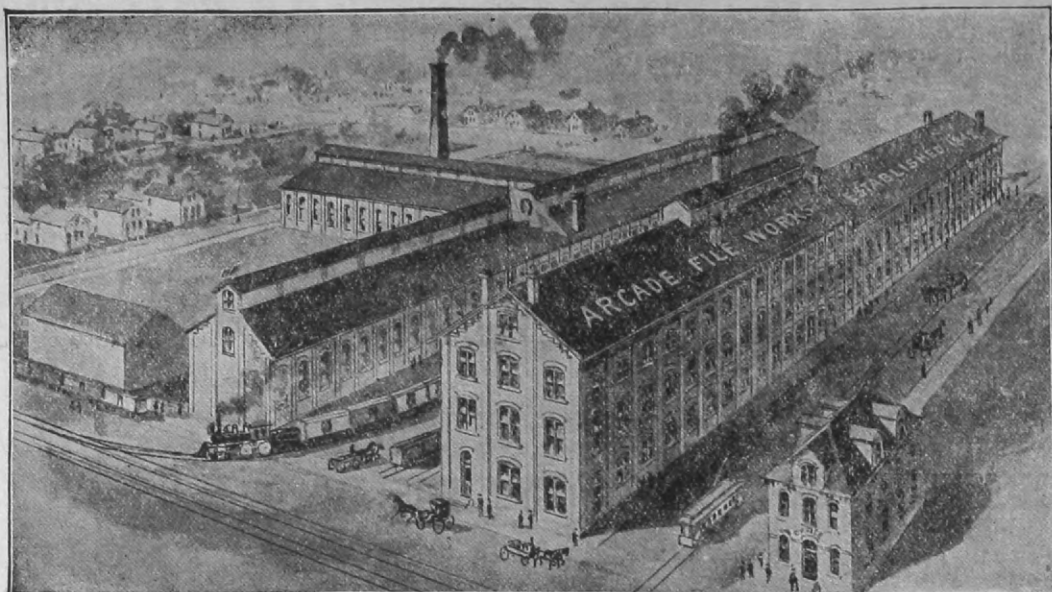
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WORKS, ANDERSON, IND.
ESTABLISHED 1842.

FILE WORKS.



Eastern
Office and
Warehouse,
33 Reade St.,
New York
City.

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Chicago,
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THE BEST EQUIPPED FILE WORKS IN THE WORLD.

The fact that we alone use the improved File Machinery recently invented by Alfred Weed, and the even heat of natural gas, enables us to produce a file that will cut faster and wear longer than any on the market

Just Published.—THIRD REVISED EDITION. THE IRON AGE STANDARD HARDWARE LISTS FOR USE IN PRICE BOOKS.

Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

Saucepans and Round Boilers.

	Plain	Turned.	Third or End.
Pints.			
1	\$0.30	.35	.39
1½	.32	.37	.44
2	.35	.39	.48
3	.42	.47	.56
Quarts.			
2	.50	.56	.63
2½	.53	.59	.68
3	.55	.62	.73
4	.60	.68	.84
5	.65	.75	.96
6	.70	.81	1.11
7	.75	.84	1.21
Gallons.			
2	.85	.96	1.31
2½	1.05	1.18	1.56
3	1.20	1.35	1.70

The success of the effort to give the lists in small space is illustrated in many of the lists, in which a clear and condensed arrangement is secured. For instance, the wrench list occupies but 3 inches by ½ inch, while the list of Stove Hollow Ware, in very small space, gives the list prices on a large and important line of goods which often occupy several pages in catalogues. In several lists, such as Strap and T Hinges and Butts, a new arrangement is adopted, which is regarded as presenting these lists in a very convenient as well as condensed form.

As is obvious from the lists herewith reproduced, the shape and size of the different lists varies greatly, the aim being to give each list the smallest and most convenient arrangement possible. None of the lists are, however, more than 3½ x 6 inches in size, very few of them being as large as this and most of them very much smaller. In use it is intended that they shall be trimmed closely before they are inserted in price books, when they may be attached either by one edge close to the hinge of the book, as will, perhaps, be most convenient with the larger lists, permitting the use of the entire page for memoranda, or the smaller lists may be pasted on the page in connection with the entries in regard to discounts, freights, &c. Many of the lists are so compact in arrangement as when thus inserted to leave ample room for recording quotations.

Wrenches.

Inches.	6	8	10	12	15	18	21
Black...	\$9.00	\$10.00	\$12.00	\$14.00	\$24.00	\$30.00	\$36.00
Bright..	10.00	11.00	14.00	16.00	26.00	32.00	38.00

Some merchants use this pamphlet for reference, checking off invoices, etc., as it gives the leading lists in a more convenient form than they can otherwise be obtained. The lists are, however, intended primarily to be cut out

Glue Pots.

No.	4/0	5/0	2/0	0	1
.....	\$4.50	5.00	5.50	6.00	6.75

and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

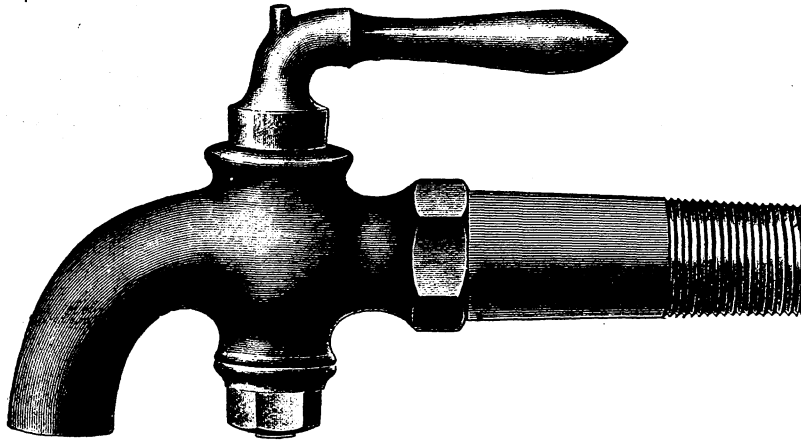
That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a Third edition is already called for.

EVERY HARDWAREMAN SHOULD HAVE A COPY. Price 25 cts.

Sent, postpaid, on receipt of Price, by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade Street, N.Y.

Standard Petroleum Oil Faucets.



These faucets are made from the best Refined Iron, with Solid Brass Key, and are fully warranted. The bearing is longer than in the ordinary faucet, making them less liable to break. Made in following sizes.

	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{3}{4}$ in.	1 in.
SCREW SHANK,	No. 13	No. 14	No. 5	No. 6	No. 7
TINNED "	No. 013	No. 014	No. 05	No. 06	No. 07
LIST,	\$6.75	\$8.25	\$9.00	\$10.50	\$12.00 per Dozen.

Write to us for Discounts, we can interest you.

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P. O. BOX 1042.

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10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET.



Made for the 22 or 25 Rim Fire Cartridge.

WEIGHT, 4½ POUNDS.

22-INCH BARREL.

LEVER ACTION LIKE SHARPS.

TAKEN APART IN TEN SECONDS.

IT IS SIMPLY IMPOSSIBLE

TO MAKE MORE

ACCURATE SHOOTING BARRELS

THAN ARE ON THIS RIFLE.

RIFLE TAKEN APART.

No. 17. Plain Open Sights.....\$12.50

No. 18. Vernier, Open Back, and Beach Front Sights..... 17.00

No. 19. Lyman Peep, Open Back, and Lyman Front Sights, 17.00

A 60 Page Catalog showing our full line of Fire Arms with TRADE PRICE LIST sent with pleasure to all dealers.

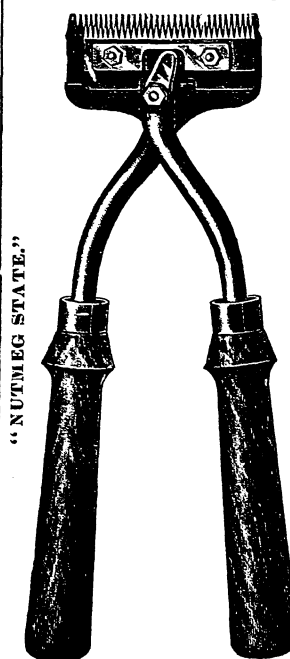
J. Stevens Arms & Tool Co.,

P. O. Box 5729.

Chilcopee Falls, Mass. U. S. A.

Edward S. Hotchkiss,

MANUFACTURER OF HARDWARE,
BRIDGEPORT, CONN.



"NUTMEG STATE."

SATISFACTORY PRICES. Standard goods. Don't fail to write when in want of Horse and Barber's Clippers, No. 20 Steel Rat Killers, Curry Combs, Metal and Wood Choker Mouse Traps, Lemon Squeezers, Baxter Pattern Wrenches, &c., &c.

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NEW YORK,
MANUFACTURERS OF

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Of all sizes, complete with tools, for Hardware, Toy, Notion and Variety trades.

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200 West Houston Street, near Varick.
Also Machinists' Tool Chests, empty. Illustrated Catalogue and prices furnished on application.

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IMPORTERS AND WHOLESALERS,

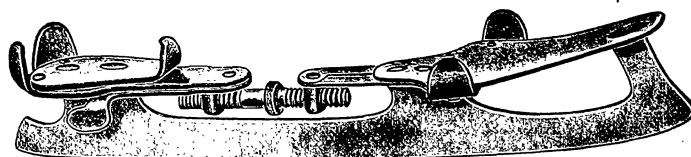
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Headquarters for Winslow Skates.

Obtain our Prices before Ordering Elsewhere.

1893-94 Catalogue Now Ready.

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The most extensive Skate Factory in the World.

BUSINESS ESTABLISHED
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INCORPORATED
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JOS. F. McCOY CO.

26 Warren St., New York,

Headquarters for

Coates' Horse Clipper

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Barber

Clippers.

ALSO

THE "BELL"

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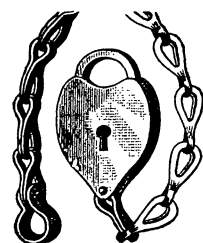
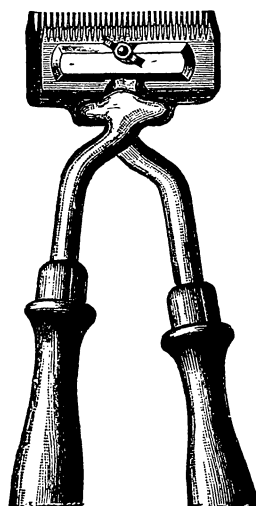
THE "COMET"

Horse

Clippers.

At prices to suit

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Bicycle Locks.

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Especially Low Prices

We manufacture
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of all descriptions to
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Orders for Skates should be placed early. Shipments from factory or
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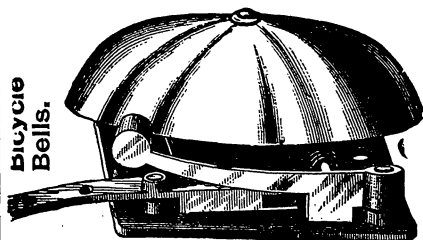
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Wholesale Hardware and Tinnern's Stock.

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Bicycle
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BEVIN BROS. MFG. CO., Easthampton, Conn.

Manufacturers of

Sleigh Bells, House Tea, Hand, Gong Bells, &c.

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WE MAKE ONLY

The Very Highest Grade

MECHANICS' TOOLS.

H. H. MAYHEW CO., Shelburne Falls, Mass.

**SHEETS,
COOKING UTENSILS,
MEDALS,**

Sheets and Rivets for Boats
and Coffins.

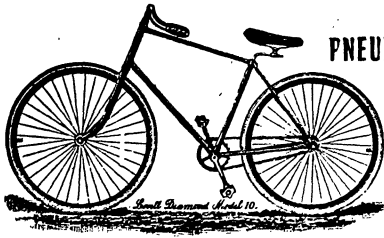
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NICKLE, Silver and Bronze Metallic
Figures and Letters, Sizes 1/4 in to 3 in.
Pattern Letters, Steel Stamps, Brands.
Dies &c. Send for Reduced Price List.
We make a specialty of the Hardware Trade.
A. A. WHITE & CO., Providence, R.I.

Lovell Diamond Cycles

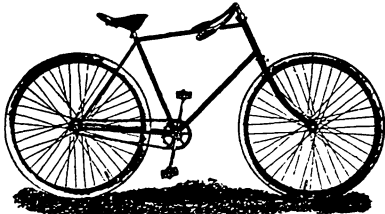


HIGHEST GRADE.
PNEUMATIC, CUSHION AND SOLID TIRES.
FOR LADIES AND GENTLEMEN.

MANUFACTURED BY
John P. Lovell Arms Co.
BOSTON, MASS.
CYCLE CATALOGUE FREE.

WESTERN WHEEL WORKS.

BICYCLE



MANF'TRS

From \$20

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MOST COMPLETE LINE MADE.

OFFICE AND FACTORY:

Wells, Schiller and Sigel Sts., and N. Park Ave., Chicago, Ill., U.S.A.

A Wheel



Properly Designed,
Practically Made,
Combining Strength,
Durability and
Perfect Qualifications.
Such are the

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Dauntless

FALCON JUNIOR, for Boys.

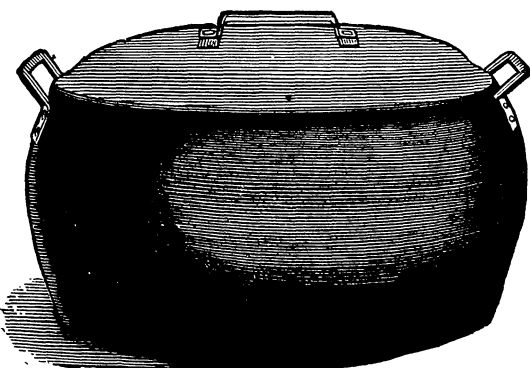
FALCON JUNIOR COMBINATION,
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The only high grade juvenile wheels made. Full ball bearings, perfectly dust proof, $1\frac{1}{2}$ in. pneumatic tire, 24 in. wheels, graceful drop handle bars, combination cork and rubber handles.

The bearings are turned out of solid bar steel, and all material and workmanship are first-class. Made in the same manner, of the same stock, with the same care as the large wheels. Good juvenile wheels are scarce, and ours are going rapidly.

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Hollow Ware,
Hardware Specialties,
Waffle Irons,
Coffee Roasters,
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Glue Pots,
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Spittoons,
Caldrons,
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Yacht and Boat Hardware.

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BOSTON, MASS.
Send for 212-Page Catalogue.



To Make a Bull's Eye

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If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a **HIT** by sending for the **IDEAL HAND BOOK**.

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MANUFACTURERS OF

HARDWARE SPECIALTIES,
Toy Banks, Etc.

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JUNIOR Retails for . . . 25 cts.
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The Largest Combination Lock Banks for
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20 OTHER STYLES.

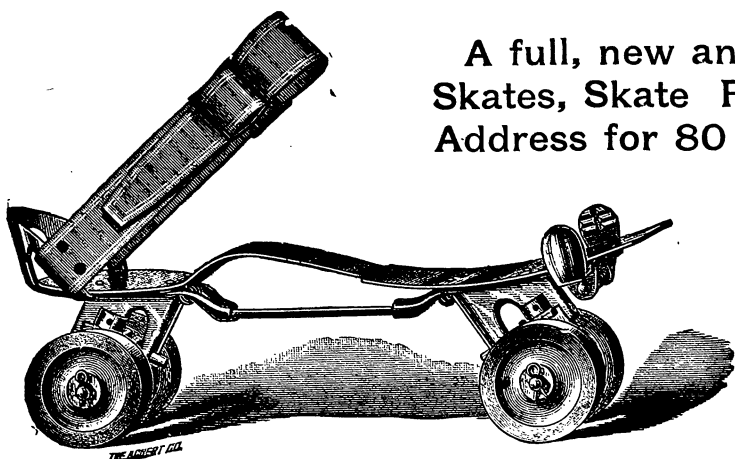
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HAVE BEEN IN BUSINESS SINCE 1840.

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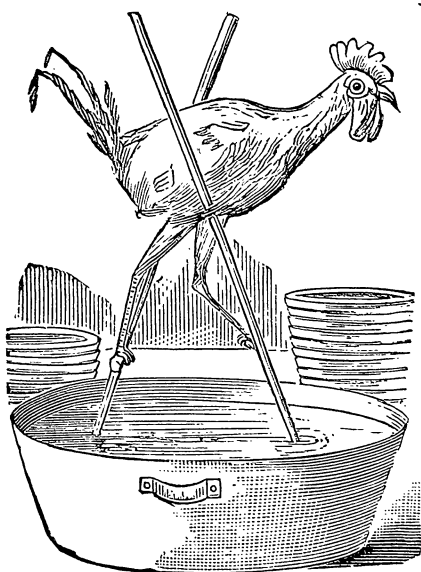
IF YOU WANT THE BEST
SILVER PLATED SPOONS
FOR CATALOGUE & PRICES
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A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page catalogue and prices,

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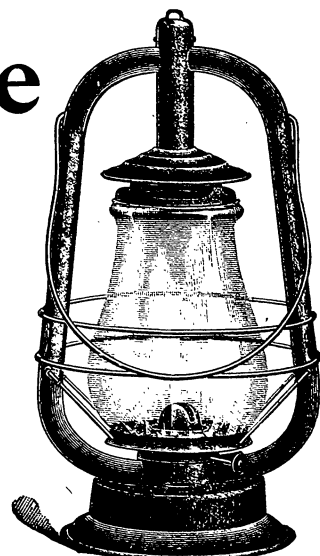
Armed against any statement we may make here, but we cannot see how you can stand and see your trade slipping away just for the want of trying a small sample order of "Surprise Tubulars." They will do you good. We have the whole line right thro'. Write us and be astonished.

OHIO LANTERN CO.,
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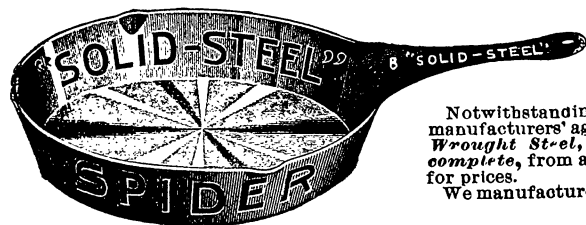
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IS THE Best Street Lamp Manufactured.
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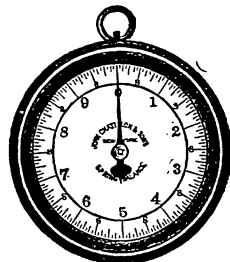
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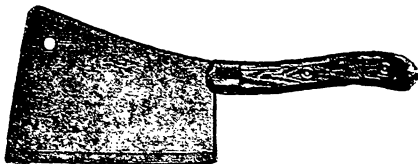
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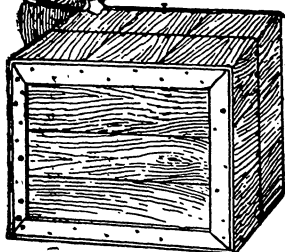
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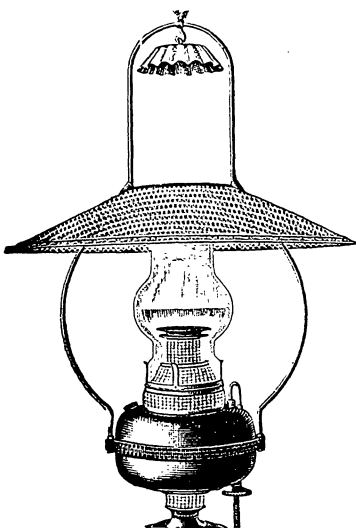
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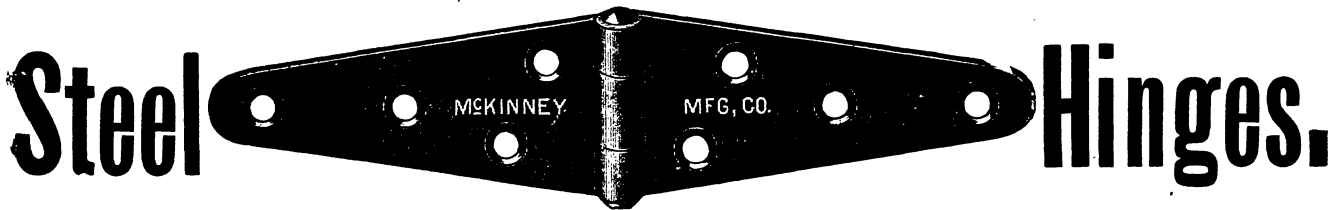
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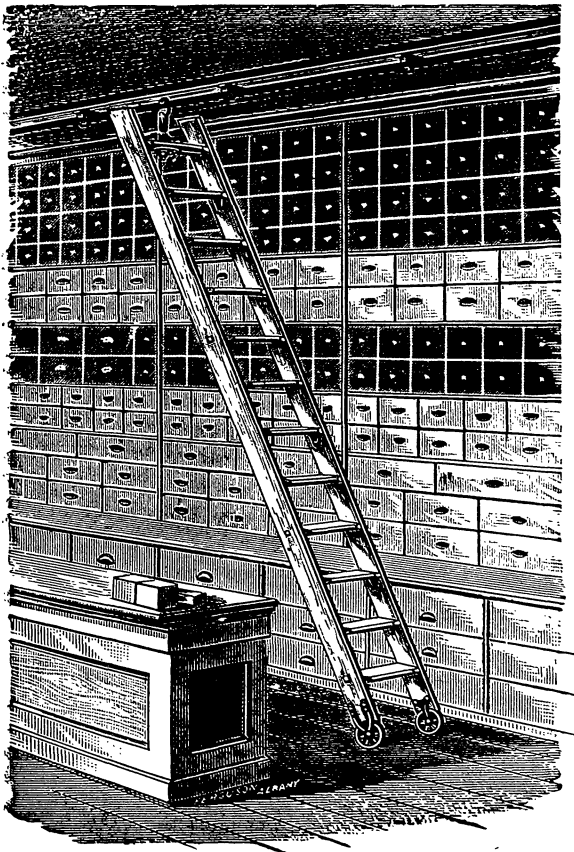
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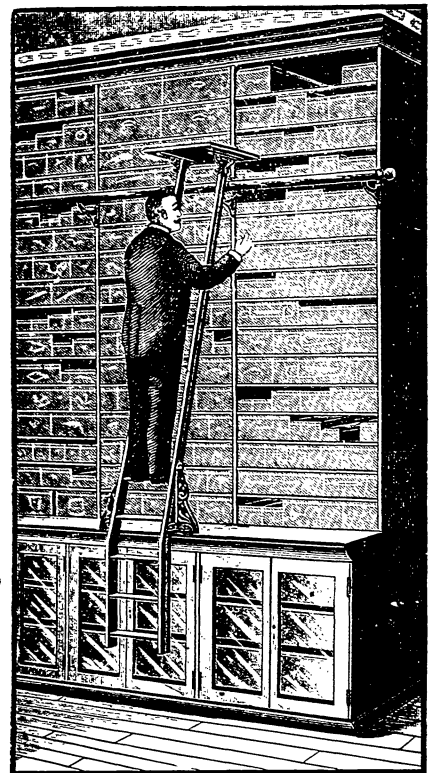
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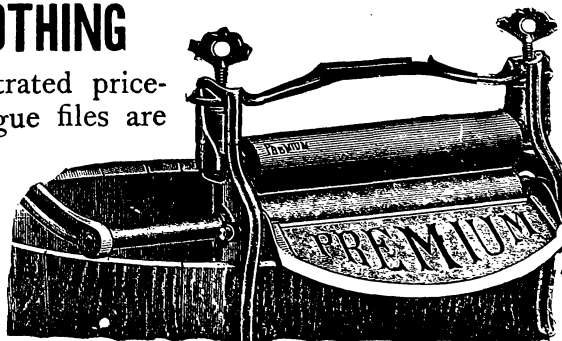
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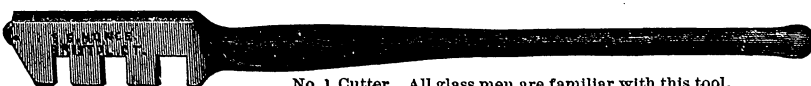
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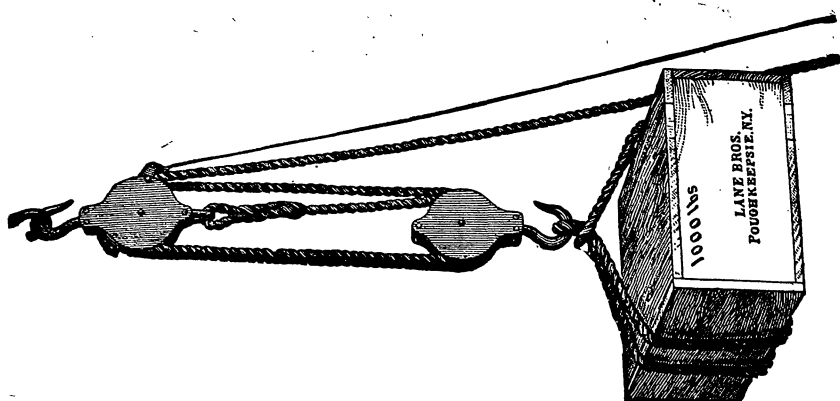
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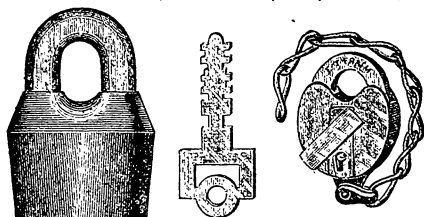
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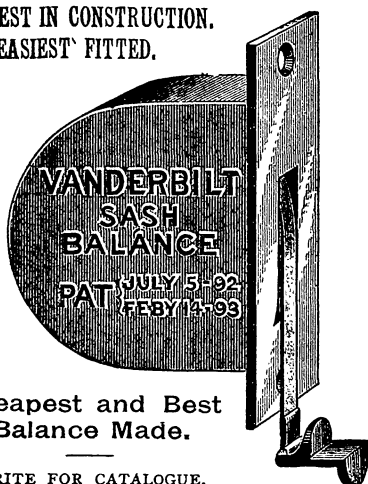
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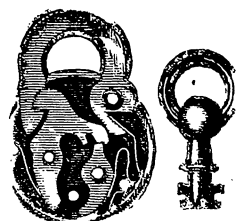
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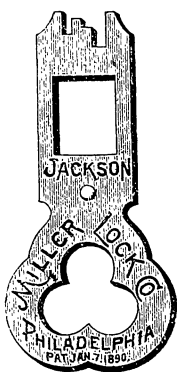
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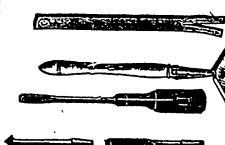
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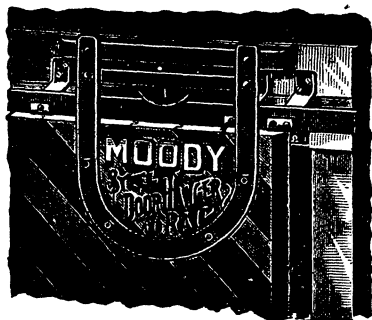


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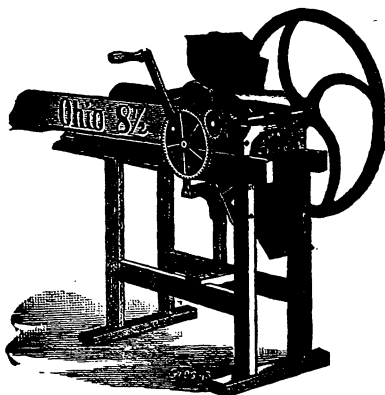
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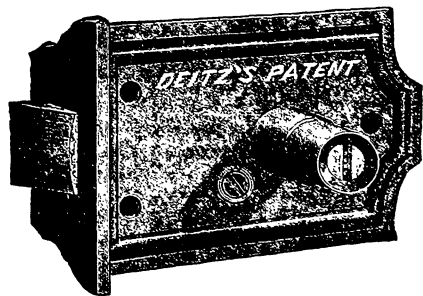
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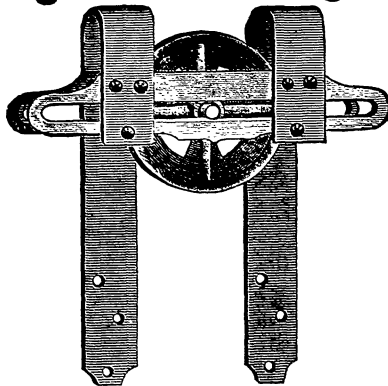
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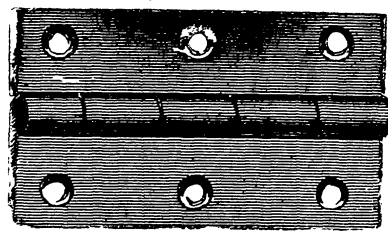
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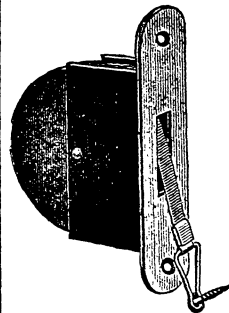
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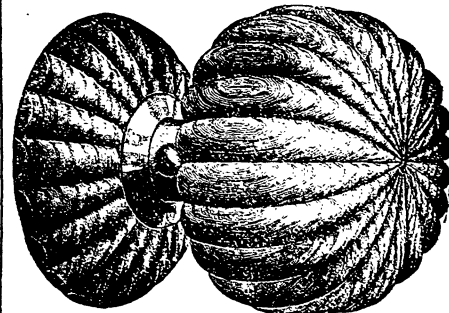
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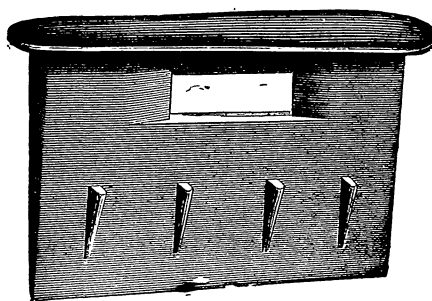
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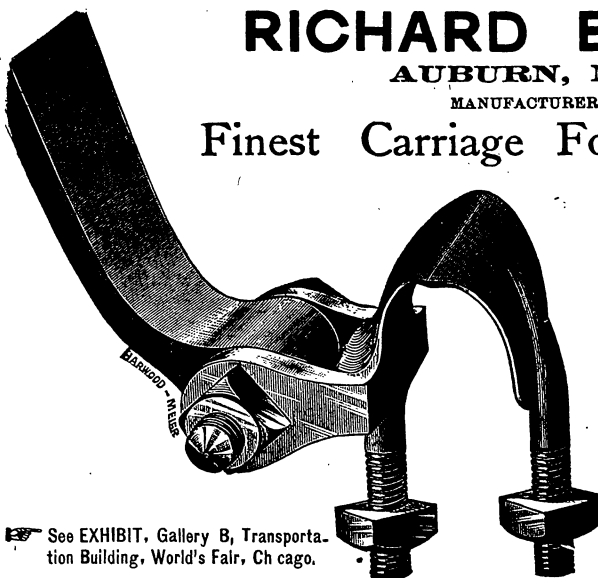
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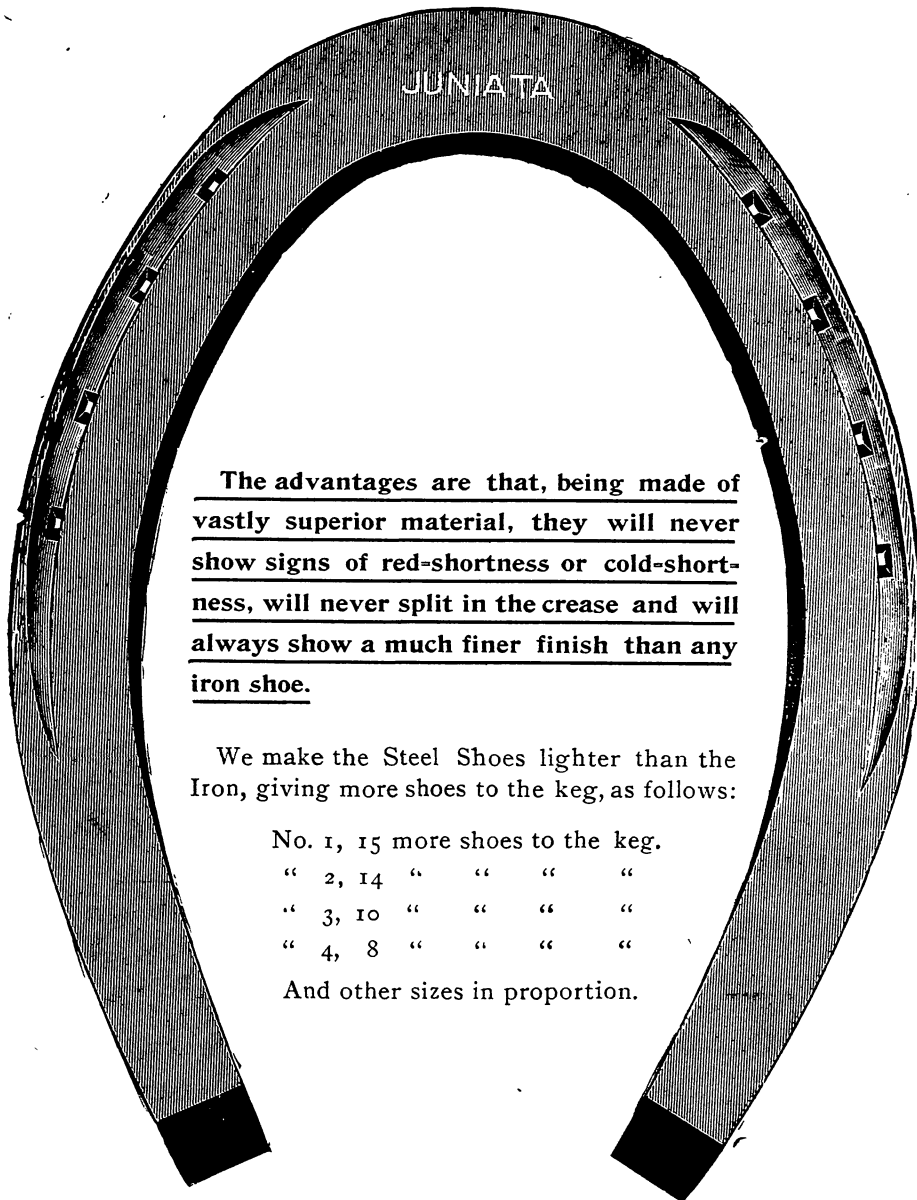
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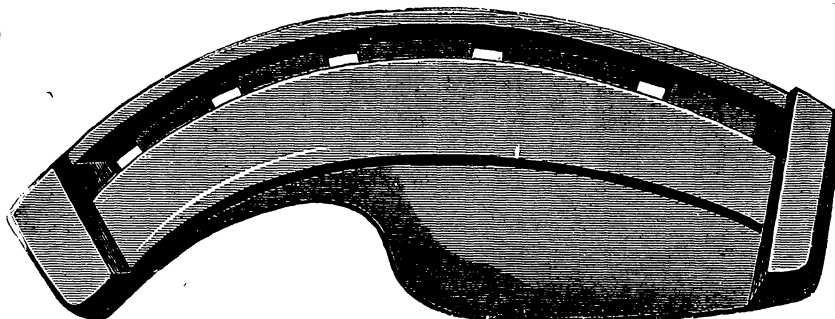
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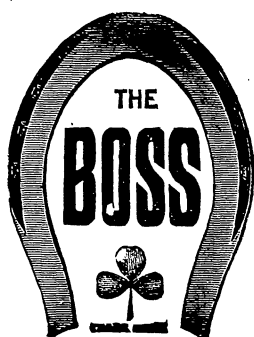
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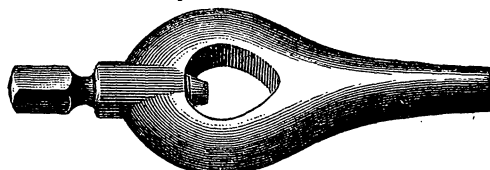
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4.....	1 1/4	90	14.....	4	2 10
5.....	1 1/2	95	15.....	4 1/2	2 75
6.....	1 3/4	95	16.....	5	3 25
7.....	1 7/8	95	17.....	5 1/2	4 00
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One set to 2 inch, \$7.50. Full set, \$14.10

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

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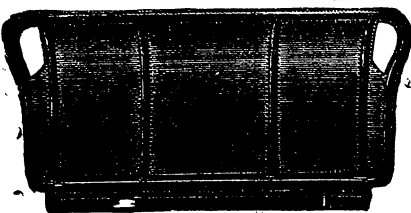
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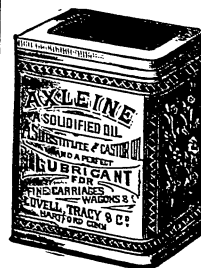
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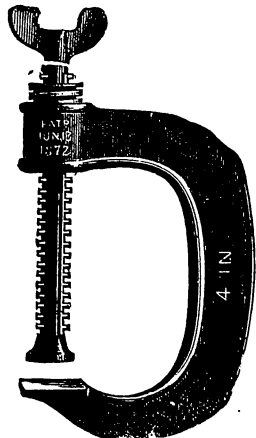
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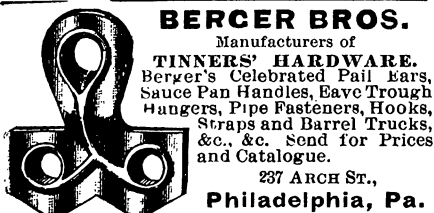
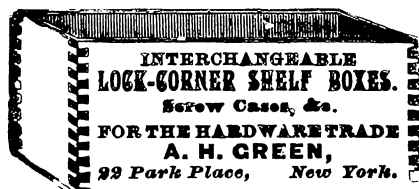
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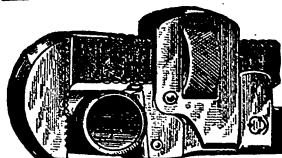
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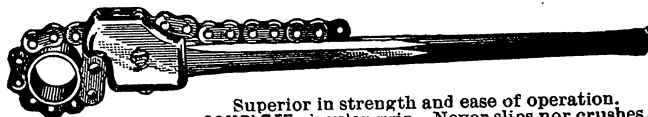
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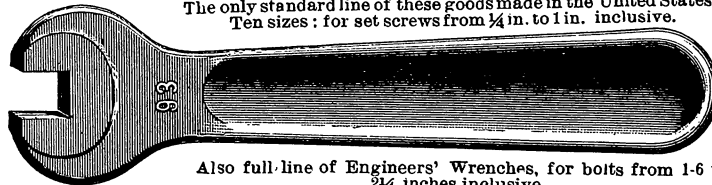


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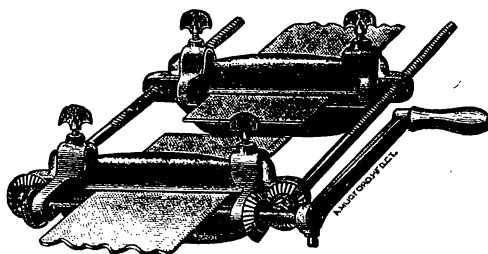
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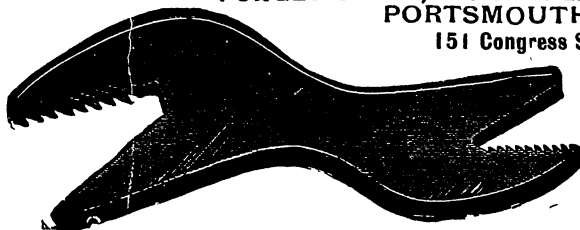
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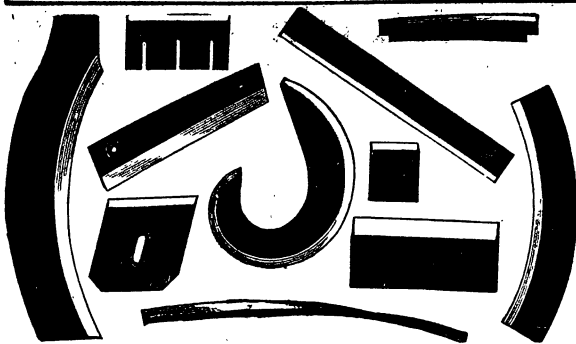
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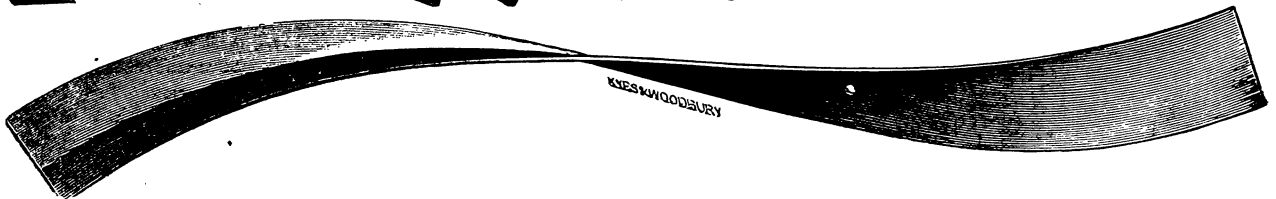
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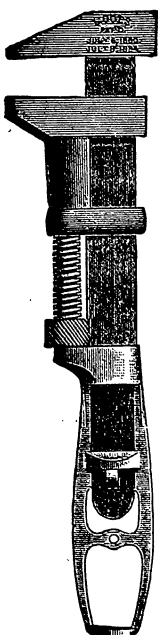
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SAMPLE 15¢.

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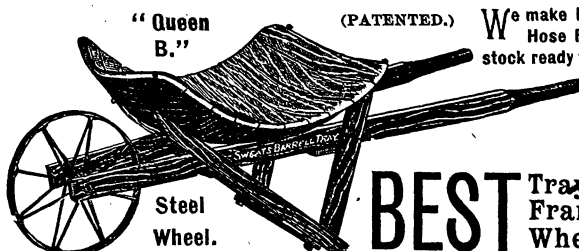
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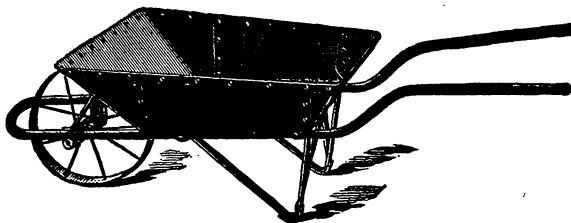
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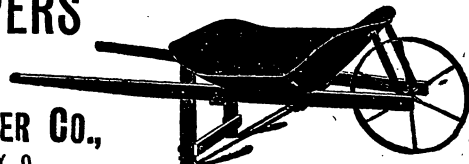
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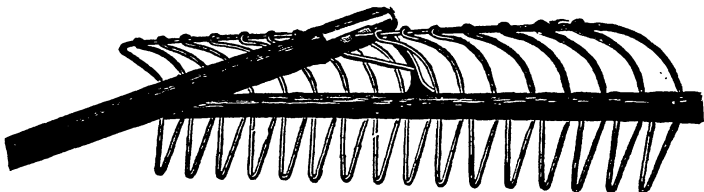
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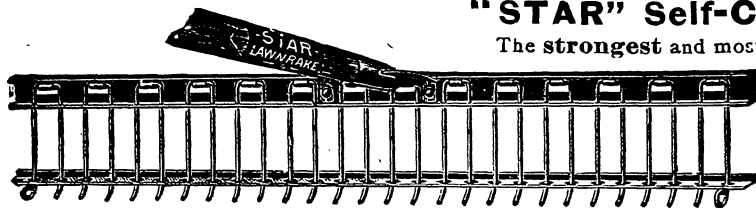
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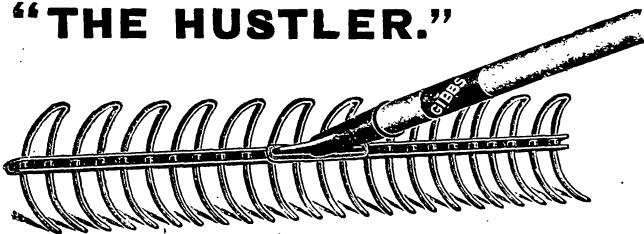
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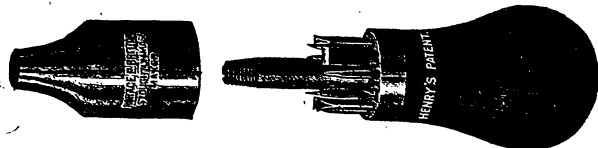
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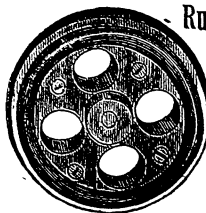


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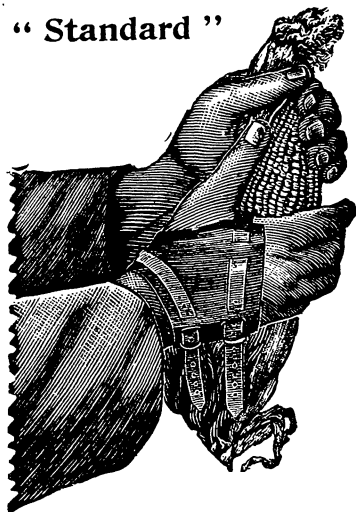
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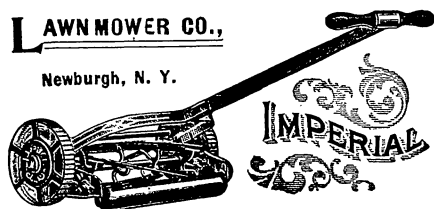
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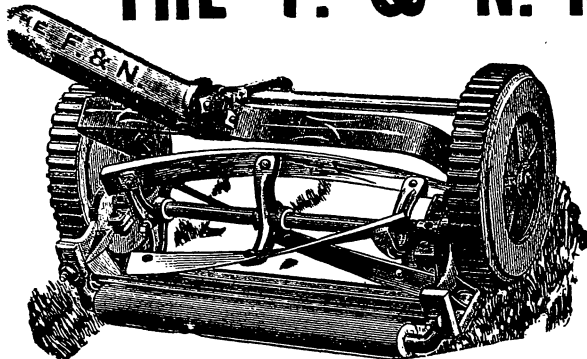
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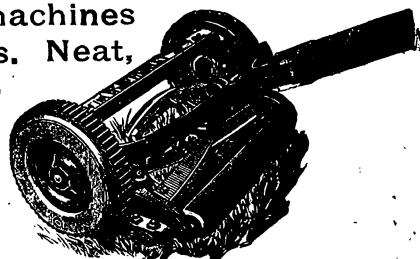
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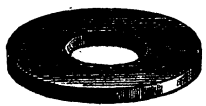
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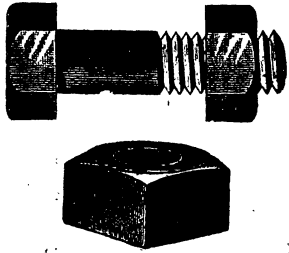
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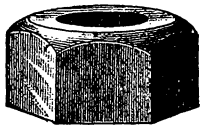
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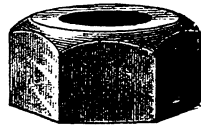
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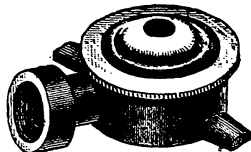


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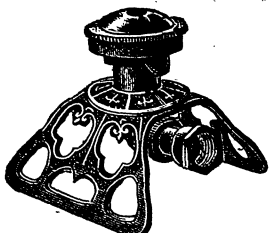
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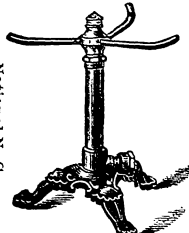
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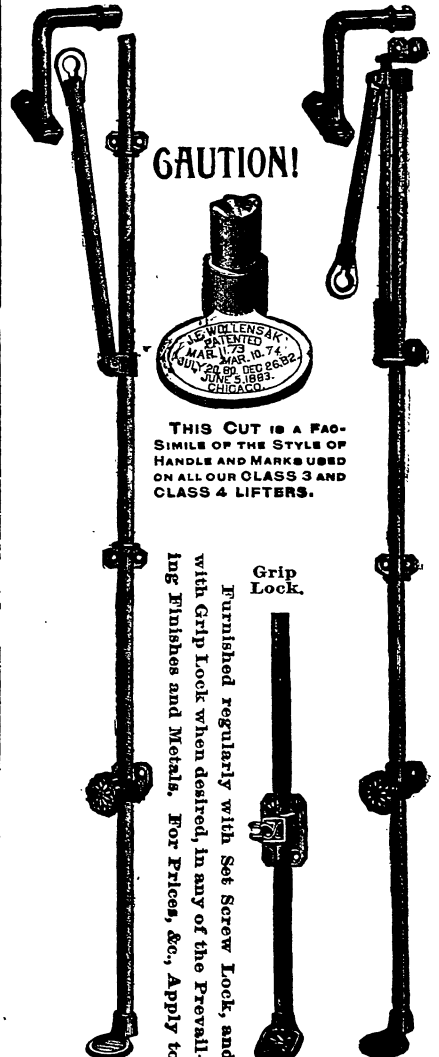
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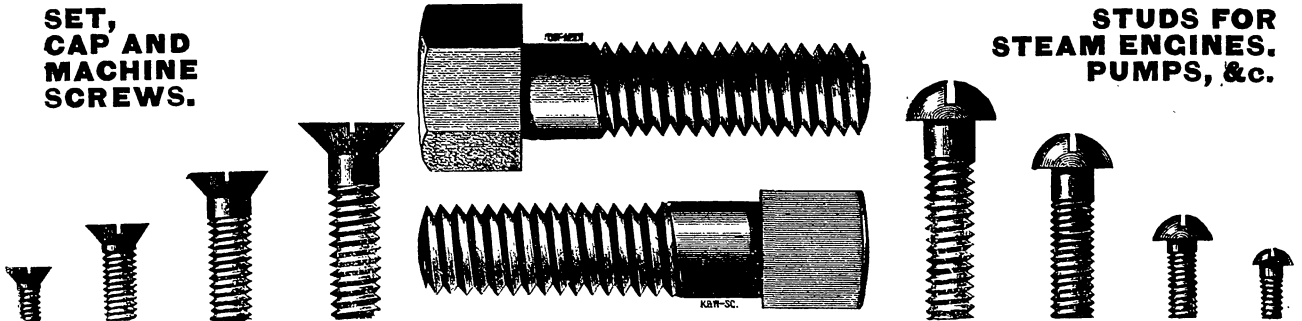
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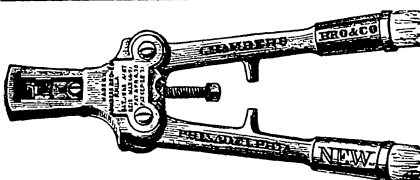
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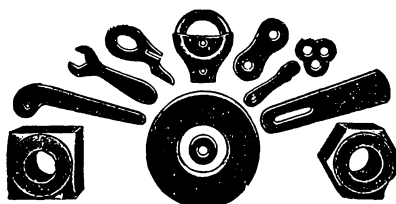
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- Faucets, Wooden. Makers of.**
Boston & Lockport Block Co., Boston Mass., and Lockport, N. Y.
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**
Davis, I. B. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
National Pipe Bending Co., New Haven, Conn.
Webster, Warren & Co., Camden, N. J.
Whitlock Coll Pipe Co., Elmwood, Conn.
- Fencing. Iron and Wire.**
Sarnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Clinton Wire Cloth Co., Clinton, Mass.
DeKalb Fence Co., DeKalb, Ill.
Gilbert & Bennett Mfg. Co., 42 Cliff St., Hartman Mfg. Co., Ellwood City, Pa.
Kilmer Mfg. Co., Newburgh, N. Y.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
Rellance Wire & Iron Wks., Milwaukee
- Files. Importers of.**
Moss, F. W., 80 John, N. Y.
- Files and Raps. Manufacturers of.**
Arcade File Works, Anderson, Ind.
Banker & White, Troy, N. Y.
- Barnett, G. & H.,** 41 & 43 Richmond St., Phila.
- Butcher, W. & S.,** 135 Duane St., N. Y.
McOatrey File Co., Philadelphia.
Nicholson File Co., Providence R. I.
- Fire Brick. Makers of.**
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B & Sons, foot E. Houston, St. Mo.
McLeod & Henry Co., Troy, N. Y.
Maurer, H. & Son, 430 E. 23d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Valentine, M. D. & Bro., Woodbridge.
- Fire Sets.**
Troy Nickel Works, Troy, N. Y.
- Fishing Tackle.**
Dame, Stoddard & Kendall, Boston, Mass.
- Filter and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**
Sills, W. H., 83 Lake St., Chicago, Ill.
- Flue Cleaners.**
Mackey, Jas. T., St. Louis, Mo.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Forges, Portable. & Co.**
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Foss Mfg. Co., Springfield, Ohio.
Johnstown, Pa.
Sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Scranton Forging Co., Scranton, Pa.
- Foundry Facings.**
Paxson, J. W. & Co., Phila.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cin., O.
- Foundry Riddles.**
Eatey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**
Colliau, Victor, Detroit, Mich.
S. Obermayer Co., Cincinnati, O.
Paxson, J. W. & Co., Philadelphia.
Smith, J. D. Fdy. Supply Co., Cin., O.
- Friction Clutches.**
Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.
- Friction Cone.**
Evans Friction Cone Co., Boston, Mass.
- Fruit Presses.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Furnaces, Foundry.**
Byram & Co., Detroit, Mich.
- Gas Producers.**
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Pancoast, Henry B. & Co., Phila., Pa.
- Gauge, Rolling Mill.**
Haines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**
Boston Gear Works Boston, Mass.
New Process Raw Hide Co., Syracuse, N. Y.
Poole, Robt. & Son Co., Baltimore, Md.
- Glass Boards.**
Canton Saw Co., Canton, O.
- Glass Cutters.**
Monce, S. G., Bristol, Conn.
- Glass Tubes.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
- Glue.**
Baeder, Adamson & Co., Phila., Pa.
Russla Cement Co., Gloucester, Mass.
- Grass Catchers.**
Supplee Hardware Co., Phila., Pa.
- Grinding Mills.**
Foss Mfg. Co., Springfield, O.
- Grinding and Polishing Machines.**
Norton Emery Wheel Co., Worcester, Mass.
Washburn Shops, Worcester, Mass.
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
- Gunpowder. Makers of.**
Lafin & Rand Powder Co., 29 Murray St., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Handles.**
New Process Raw Hide Co., Syracuse, N. Y.
New York Mallet and Handle Wks., 466 E. Houston St., N. Y.
- Hangers, Door.**
Chicago Spring Butt Co., Chicago, Ill.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Hardware Comm'n Merchants.**
Doscher, Martin, 88 Chambers, N. Y.
Feld, Alfred & Co., 98 Chambers St., N. Y.
Graham, John H. & Co., 111 Chambers St., New York.
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Hotchkiss, E. S., Bridgeport, Conn.
Starba, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**
Bingham, W. Co., Cleveland, O.
Graham, John H. & Co., 113 Chambers, McCoy, Jos. F. Co., 28 Warren St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
Underhill, Clinch & Co., 94 Chambers St., N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Beiden Machine Co., New Haven, Conn.
Empire Portable Forge Co., Lansingburg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Haines & Zimmerman, Phila. Pa.
Hart, H. C. Mfg. Co., Detroit, Mich.
Henn, A. S. & Co., New Haven, Conn.
Johnson, S. C., Racine, Wis.
Knap & Cowles Mfg. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Weiland, Chas., 119 Chambers St., N. Y.
Wilson, J. Fred, Worcester, Mass.
Underhill, Clinch & Co., 94 Chambers Street, N. Y.
- Hardware, Yacht and Ship.**
Ferdinand, L. W. & Co., Boston, Mass.
- Harness Snaps.**
Covert Mfg. Co., West Troy, N. Y.
Coverts' Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Hay Knives.**
Holt, Hiram, Co., E. Wilton, Me.
- Holting Machines.**
Box, Alfred & Co., 314 Green, Phila.
Jones, H. Holting & Conveying Mch. Co., Cleveland, Ohio.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E. Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 36 Liberty, N. Y.
Marie & Becker, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Speidel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**
Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
Stuart & Peterson Co., Phila., Pa.
- Hollow Ware, Aluminum.**
Illinois Pure Aluminum Co., Lemont, Ill.
- Horse and Barbers' Clippers.**
Hotchkiss, E. S., Bridgeport, Conn.
- Horse Nails. Makers of.**
National Horse Nail Co., Vergennes, Vt.
- Horse and Mule Shoes. Makers of.**
Bryden Horse Shoe Co., Catsanqua, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Shoenberger & Co., Pittsburgh, Pa.
Standard Horse Shoe Co., Boston, Mass.
- Hose.**
Cleveland Rubber Works, Cleveland, O.
N. Y. Belting & Packing Co., Ltd., 16 Park Row, N. Y.
- Hydrants, & Co.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Jacks.**
Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.
- Ice-Cream Freezers.**
North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
White Mountain Ice-Cream Co., Nashua, N. H.
- Ice Shavers.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Injectors.**
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., New York
- Insurance, Boiler.**
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**
Corning, Edw. & Co., 39 B'way, N. Y.
Cotton, Bradley & Co., Philadelphia, Pa.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Keeley, Jerome & Co., Philadelphia.
Lee, J. Tatnall & Co., Philadelphia.
Mohr, J. J., 480 Walnut, Philadelphia.
Pilling & Crane, Philadelphia, Pa.
Sibell, Geo. H. & Co., Chicago, Ill.
Wister, L. & R. & Co., Phila., Pa.
- Iron Ore.**
Naylor & Co., 45 Wall, N. Y.
Pickands, Brown & Co., Chicago, Ill.
Fulman, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.
- Iron. Merchants.**
Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Bussatus & Cunliffe, Philadelphia.
Corning Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 440 West St., N. Y.
Naylor & Co., 45 Wall St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pickands, Brown & Co., Chicago, Ill.
Pierston & Co., 29 Broadway, N. Y.
Richards, D. W. & Co., 88 Madison St., N. Y.
Thomson, W. H. & Co., Phila., Pa.
Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.
- Iron, Importers.**
Abbott Wheelock & Co., N. Y. and Boston
Lundberg, Gustaf, Boston, Mass.
- Iron, Sheet. Manufacturers of.**
Cambridge Iron & Steel Co., Cambridge Ohio
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Ironwork, Ornamental.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladies.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamp Stoves.**
Glazier Stove Co., Chelsea, Mich.
- Lamps.**
Standard Lighting Co., Cleveland, O.
- Lanterns.**
Ohio Lantern Co., Tiffin, Ohio.
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr. & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing Wire.**
Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Lawn Mowers.**
Chadborn & Coldwell Mfg. Co., Newburg, N. Y.
Coldwell Lawn Mower Co., Newburg, N. Y.
F. & N. Mfg. Co., Richmond, Ind.
Henley, M. C., Richmond, Ind.
Lape, W. E., Syracuse, N. Y.
Mast, Foss & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supplee Hdw. Co., Phila., Pa.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, Ohio.
Schaeffer & Co., Dayton, Ohio.
Syracuse Specialty Mfg. Co., Syracuse, N. Y.
- Lawn Sprinklers.**
Ette & Henger Mfg. Co., St. Louis, Mo.
McGowan, John H. Co., Cincinnati, O.
- Lawn Sweepers.**
Lape, W. E., Syracuse, N. Y.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letters and Figures, Metallic.**
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Davis & Cook, Watertown, N. Y.
Richardson, C. F., & Son Athol, Mass.
- Locks & Knobs. Manufacturers of.**
Deits, A. E., 97 Chambers, N. Y.
Keyless Lock Co., Chicago, Ill.
Reading Edw. Co., Reading, Pa.
Smith & Eggs Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.

Machinery.

Am. Tool Works, Cleveland, Ohio.
 Barnes, W. F. & John, Rockford, Ill.
 Sement, Miles & Co., Philadelphia, Pa.
 Sigelow, C. E., 45 Dey, N. Y.
 Bignall & Keeler Mfg. Co., St. Louis.
 Birmingham Iron Foundry, Birmingham, Conn.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Bogert, Jno. L., Flushing, N. Y.
 Briggs, Marvin, 12 Broadway, N. Y.
 Carlin's Sons, Thos., Allegheny, Pa.
 Cinn. Milling Mch. Co., Cincinnati, Ohio.
 Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
 Coulter & McKenzie Mch. Co., Bridgeport, Conn.
 Crutcher & Harvey Mch. Co., Baltimore, Md.
 Fitchburg Mch. Works, Fitchburg, Mass.
 Garvin Mch. Co., Light & Canal Sts.
 Gould & Eberhardt, Newark, N. J.
 Hamilton Mch. Tool Co., Hamilton, O.
 Harrington, E. Son & Co., Phila., Pa.
 Henderer, A. T., Wilmington, Del.
 Henderer Machine Co., Torrington, Ct.
 Hill, Clarke & Co., Boston, Mass.
 Johnson, Israel H., Jr., & Co., Phila.
 Jones & Lamson Mch. Co., Springfield, Vt.
 Lodge & Shipley Mch. Tool Works, Cincinnati, O.
 Lovegrove & Co., Philadelphia, Pa.
 McCabe, J. J., 68 Cortlandt, N. Y.
 Machinists Supply Co., Rochester, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Conn.
 Newark Mch. Tool Works, Newark, N. J.
 New Haven Mfg. Co., New Haven, Conn.
 New York Mach. Depot, N. Y.
 Niles Tool Wks., 138 Liberty St., N. Y.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Place, Geo., 120 Broadway, N. Y.
 Poole, Robt. & Son Co., Baltimore, Md.
 Powell Planer Co., Worcester, Mass.
 Pratt & Whitney Co., Hartford, Conn.
 Frontis Tool & Supply Co., N. Y.
 Scranton Supply & Mch. Co., Scranton, Pa.
 Sellers, Wm. & Co., Phila.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Steptoe, J. & Co., Cincinnati, O.
 Stow Flexible Shaft Co., Ltd., Phila.
 Toomey, Frank, Philadelphia, Pa.
 Wetherill, Robert & Co., Chester, Pa.
 Wilson, W. A., Rochester, N. Y.

Machinery for Hardware Manufacture.

Adt, Jno. & Son, New Haven, Conn.

Machine Knives.

Loring Co. & Co., Worcester, Mass.
 Loyd, John, 558-562 Water St., N. Y.

Machine Tools.—See Machinery.**Machine Work.**

Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.

Coffin & Leighton, Syracuse, N. Y.
 Starrett, L. S., Athol, Mass.

Machinists' Tools and Supplies.

King, J. M. & Co., Waterford, N. Y.
 Sellers, Wm. & Co., Inc., Phila.

Mallets.

N. Y. Mallet & Handle Works, N. Y.

Manufacturing Sites.

Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.

Measuring Tapes.

Keuffel & Esser Co., 127 Fulton St., N. Y.
 Lufkin Rule Co., Saginaw, Mich.

Meat Cutters.

Enterprise Mfg. Co., Philadelphia, Pa.

Mechanical Instruction.

Correspondence School of Mechanics, Scranton, Pa.

Metals.

Fearing, Wm. S., 100 Chambers, N. Y.
 Hendricks Bros., 49 Cliff, N. Y.
 Naylor & Co., 45 Wall, N. Y.

Metal Brokers.

American Metal Co., N. Y.

Metallurgists.

Britton J. Blodgett, Phila.

Milling Machines.

Cin. Milling Mch. Co., Cincinnati, Ohio.

Mining Knives.

Palmer Hdw. Mfg. Co., Troy, N. Y.

Mine Lamps.

Darby, Edw. & Sons, Phila. Pa.
 Leonard, B. E., Scranton, Pa.
 Leonard, T. F., Scranton, Pa.

Mining Screens.

Harrington & King Perforating Co., Chicago, Ill.
 Howard & Morse, 45 Fulton, N. Y.

Mirrors.

Rice, C. F., Chicago, Ill.

Molding Sand.

Obermayer, S. Co., Cincinnati, O.
 Paxson, J. W. & Co., Phila.

Motors, Water and Electric.

O. & C. Electric Co., 402 and 404 Greenwich St., N. Y.
 Dallett, Thos. H. & Co., Phila., Pa.

Wall Machinery.

Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nails (Cut) and Spikes.

Borden & Lovell, 70 West, N. Y.
 Cumberland Nail & Iron Co., Phila.
 Oxford Iron Co., 81 W. Washington, N. Y.
 Pottstown Iron Co., Pottstown, Pa.
 Riverside Iron Wks., Wheeling, W. Va.

Neck Yokes.

Johnson, S. C., Racine, Wis.

Nickel Platers' Supplies.

Eddy Electric Mfg. Co., Windsor, Conn.
 Zucker & Levent Chemical Company, 10 to 14 Grand St., N. Y.

Norway Shapes, Rollers of.

Bowland, William & Harvey, Framford, Philadelphia

Novelty Manufacturers.

Franklin, H. H. Mfg., Syracuse, N. Y.

Nut Machines.

Dunham Nut Mch. Co., Unionville, Ct.

Nuts, Bolts, &c., Makers of.

American Bolt Co., Lowell, Mass.
 American Screw Co., Providence, R. I.
 Blake & Johnson, Waterbury, Conn.
 Haskell, Wm. H. Co., Pawtucket, R. I.
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.
 Fort Chester Bolt and Nut Co., Chester, N. Y.
 Russell, Burdall & Ward, Port Chester, N. Y.
 Sternbergh, J. H. & Son, Reading, Pa.
 Wilson, J. Fred., Worcester, Mass.
 Wm. H. Haskell Co., Pawtucket, R. I.

Oilers.

Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

Oil Stones.

Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.

Glazier Stove Co., Chelsea, Mich.

Ores.

Wister, Francis, Philadelphia, Pa.

Px Shoes.

Scranton Forging Co., Scranton, Pa.

Packing.

Billington, Jas. H. & Co., Phila., Pa.
 Morrison, Robt., St. Louis, Mo.
 N. Y. Beltina & Packing Co. Ltd., N. Y.

Padlocks.

Ames Sword Co., Chicopee, Mass.
 Frain, E. T., Lancaster, Pa.
 Hillebrand & Wolf, Phila., Pa.
 Miller Lock Co., Philadelphia, Pa.

Paints.

Dixon, Jos. Crucible Co., Jersey City, N. J.
 Garry Iron & Steel Roofing Co., Cleveland, O.

Paint Burners.

Dangler Stove & Mfg. Co., Cleveland, O.

Paint Cans.

Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

Patent Solicitors.

Bowman & Bowman, Phila. & Wash'ton.
 Jenner, H. W. T., Washington, D. C.
 Stocking, E. B., Washington, D. C.

Perforated Metal.

Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Phosphor Bronze.

Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia.

Phosphor Tin.

Crosby Phosphorized Metal Co., Philadelphia, Pa.
 Crosby Steam Gage & Valve Co., Boston, Mass.
 Haik & Naumann, 516 Pearl, N. Y.

Picks and Mattocks.

Plumb, Fayette K., Philadelphia, Pa.

Pig Iron.

Houston, C. B. & Co., Philadelphia, Pa.
 Montour Iron & Steel Co., Danville, Pa.
 Naylor & Co., 45 Wall, N. Y.
 Pickands, Brown & Co., Chicago, Ill.
 Pilling & Crane, Philadelphia, Pa.
 Samuel, Frank, Philadelphia, Pa.

Pig Iron Storage.

Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

Pile Drivers.

Vulcan Iron Wks., Chicago, Ill.

Pipe Bent.

National Pipe Bending Co., New Haven

Pipe Cutting and Threading Machines.

Bignall & Keeler Mfg. Co., St. Louis, Mo.
 Merrill Mfg. Co., Toledo, O.
 Fancoast Henry B. & Co., Philadelphia.
 Saunders Sons, D., Yonkers, N. Y.

Pipe Grips.

Frentiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c., Makers of.

McNab & Harin Mfg. Co., N. Y.

Pipe, Water and Gas, Makers of.

Cumberland Nail & Iron Co., Phila., Pa.
 Donaldson Iron Co., Emaus, Pa.
 Riverside Iron Works, Wheeling, W. Va.
 Wood, R. D. & Co., Philadelphia, Pa.

Plane Irons, Manufacturers of.

Buck Bros., Millbury, Mass.

Planes, Manufacturers of.

Stanley Rule & Level Co., N. Y.

Plate Bending Rolls.

Schneekloth, H. A., 530 W. 28th St., N. Y.

Plate, Iron and Steel, Mfrs of.

Etna-Standard Iron & Steel Co., Bridgeport, Ct.
 Lukens Iron & Steel Co., Coatesville, Pa.
 Mahoning Valley Iron Co., Youngstown, Ohio.
 Moorhead-McLean Co., Pittsburgh, Pa.
 McIlvain & Sons, Reading, Pa.
 Pottstown Iron Co., Pottstown, Pa.
 Pottsville Iron & Steel Co., Pottsville, Pa.

Singer, Nimick & Co., Pittsburgh, Pa.
 The Mahoning Valley Iron Co., Youngstown, O.
 Wellman Iron & Steel Co., Thurlow, Pa.
 Wood Alan Co., Philadelphia.

Plating, Nickel, Brass and Silver.

Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

Pokers and Lifters.

Troy Nickel Works, Troy, N. Y.

Polishing Machines.

Watson & Stillman, 204 E. 43d, N. Y.

Polishing Wheel.

La Massena, C. E. & Co., Newark, N. J.

Post Hole Diggers.

Kohler, F. E. & Co., Canton, O.
 Wister, L. R. & Co., Philadelphia, Pa.

Poultry Nettings.

Barnum, E. T., Detroit, Mich.
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.
 Silver Finish, N. Y.
 Tryer Wire Wks. Co., W. S., Cleveland, O.

Power Hack Saws.

Millers Falls Co., 93 Reade St., N. Y.

Power Hammers.

Belden Mach. Co., New Haven, Conn.
 Dienelt & Eisenhardt, Philadelphia.
 Jenkins & Lingie, Bellefonte, Pa.

Presses, Dies, &c.

E. W. Bliss Co., Brooklyn, N. Y.
 Crosby, G. A. & Co., Chicago, Ill.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Waterbury Mch. Co., Waterbury, Conn.

Presses, Power, Makers of.

Bliss, E. W. Co., Brooklyn, N. Y.
 Mayville, E. J. Mch. Co., Waterbury, Ct.
 Merriman, A. H., Meriden, Conn.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Pulleys.

Keystone Clutch Mch. Wks., Phila., Pa.

Pulverizing Mill.

Bradley Fertilizer Co., Boston, Mass.

Pumping Machinery.

Coulter & McKenzie Mch. Co., Bridgeport, Conn.
 Dean Bros. Steam Pump Works, Indianapolis, Ind.
 Hooker-Colville Steam Pump Co., Chicago, Ill.
 McGowan, J. H. & Co., Cincinnati, O.
 Maslin, J. & Son, Jersey City, N. J.
 Newark Iron Wks. Co., So. Norwalk, Conn.
 Southark Fdy. & Mch. Co., Phila., Pa.
 Valley Pump Wks., Easthampton, Mass.
 Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Pumps, Makers of.

Bellevue Pump Co., Bellevue, Iowa.
 Deming Co., Salem, U.
 Douglas, W. & B., Middletown, Conn.
 Mast, Foss & Co., Springfield, O.
 Myers, F. E. & Bro., Ashland, O.

Punches and Shears, Hand and Power.

E. W. Bliss Co., Brooklyn, N. Y.
 Chubb Barrow & Mch. Co., Jersey City, N. J.
 Crosby, G. A. & Co., Chicago, Ill.
 Henderer, A. L., Wilmington, Del.
 Schneekloth, H. A., 530 W. 28th St., N. Y.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.

Rails, Old and New.

Perry, W. H. & Co., Providence, R. I.
 Schwarzenberg Bros. & Co., Cleveland, O.

Rat and Mouse Traps.

Burditt & Williams, Boston, Mass.
 Hendryx, A. B. Co., New Haven, Conn.
 Ripley Mfg. Co., Unionville, Conn.

Razors.

Butcher, W. & S., 135 Duane St., N. Y.
 Curley, J. & Bro., 6 Warren St., N. Y.
 Electric Cutlery Co., 113 Chambers, N. Y.
 Schmitz, E., Lothar, 92 Reade St., N. Y.
 J. R. Torrey Razor Co., Worcester, Mass.

Refrigerator Door Fasteners.

Conroy, P. J. & Co., Philadelphia.

Rivets.

Blake & Johnson, Waterbury, Conn.
 Boyce Rivet Co., Muncie, Ind.
 Burden Iron Co., Tr. Y., N. Y.
 Cobb & Drew, Plymouth, Mass.
 Henderson, Jas. S., 165 Greenwich, N. Y.
 Plymouth Mills, Plymouth, Mass.
 Sternbergh, J. H. & Son, Reading, Pa.
 Townsend, W. P. & Co., New Brighton, Pa.

Riveting Machines.

Adt, Jno. & Sons, New Haven, Conn.

Rock Drills.

Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
 Band Drill Co., 23 Park Place, N. Y.

Rolling Mill Machinery.

Birmingham Iron Fdy., Birmingham, Conn.
 Booth, The Lloyd, Co., Youngstown, O.
 Leeburg Foundry & Mch. Co., Pittsburgh, Pa.
 Mahoning Fdry & Mch. Co., Danville, Pa.
 Morgan Construction Co., Worcester, Mass.

Roll Lathes.

Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel.

Booth, The Lloyd, Co., Youngstown, O.
 Garrison, A. Fdry. Co., Pittsburgh, Pa.
 Seaman, Sleeth & Black, Pittsburgh.
 Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Roofing.

Berlin Iron Bridge Co., E. Berlin, Conn.
 Boston Bridge Works, Boston, Mass.
 Cambridge Roofing Co., Cambridge, O.
 Cincinnati Corrugating Co., Piqua, O.
 Johns, H. W. Mfg. Co., 37 Maiden Lane

Rope and Web Goods.

Covert Mfg. Co., West Troy, N. Y.
 Covert's Saddlery Wks., Farmer, N. Y.

Rope Wheels.

Cresson, Geo. V. Co., Philadelphia, Pa.

Rubber Goods.

Canfield, H. O., Bridgeport, Conn.

Rules, Manufacturers of.

Keuffel & Esser Co., 127 Fulton St., N. Y.
 Lufkin Rule Co., Saginaw, Mich.
 Standard Rule Co., Athol, Mass.
 Stanley Rule & Level Co., 28 Chambers,

Sand Paper.

Baeder, Adamson & Co., Phila., Pa.

Sash Balances.

Pullman Sash Balance Co., Rochester, N. Y.
 Vanderbilt Sash Balance Co., Canandaigua, N. Y.

Sash Cords and Chains.

Morton, Thos., 65 Elizabeth, N. Y.
 Ossawan Mills Co., Norwich, Conn.
 Samson Cordage Works, Boston, Mass.
 Smith & Egge, Mfg. Co., Bridgeport, Conn.
 Cincinnati Corrugating Co., Piqua, O.

Sash Fasteners.

Wooster, F. V., Boston, Mass.

Sash Locks.

Ives, H. B. & Co., New Haven, Conn.

Sash Pulleys.

Empire Portable Forge Co., Lansingburgh, N. Y.
 Palmer Hardware Mfg. Co., Troy, N. Y.

Sash Weights.

Brown, E. E. & Co., Philadelphia, Pa.

Saws, Makers of.

Diston, Henry & Sons, Phila., Pa.
 Hiles, C. A. & Co., 335-338 Carroll Ave, Chicago, Ill.
 National Saw Co., 96 Reade St., N. Y.
 Simonds Mfg. Co., Fitchburg, Mass.

Saw Sets.

Kohler, F. E. & Co., Canton, Ohio.
 Taintor Mfg. Co., 84-86 Chambers, N. Y.

Scales, Manufacturers of.

Buffalo Scale Co., Buffalo, N. Y.
 Chastillon, John & Sons, 85-89 Cliff, N. Y.

Scrapers, Road.

Am. Steel Scraper Co., Sidney, Ohio.
 Kilbourne & Jacobs Mfg. Co., Columbus, O.
 Sidney Steel Scraper Co., Sidney, O.

Screens, Coal and Ore.

Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Screens, Door and Window.

Queen Anne Screen Co., Burlington, Vt.

Screw Cutting Machinery.

Wells Bros. & Co., Greenfield, Mass.
 Wiley & Russell Mfg. Co., Green

- Allentown Rolling Mill.** Allentown, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Pasale Rolling Mill Co., Paterson, N. J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
Tudor Iron Works, St. Louis, Mo.
- Shears and Scissors.**
Acme Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Elms Standard Iron and Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chees Bros., Pittsburg, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Moorehead-McCleane Co., Pittsburg, Pa.
Pierston & Co., 29 Broadway, N. Y.
Reilly, John W., Fort Hunter P. O., Pa.
Singer, Nimick & Co., Ltd., Pittsburg, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Metal Work.**
Clark & Cowles, Plainville, Conn.
- Sheet Zinc.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**
Koch, A. B. & Co., Peoria, Ill.
- Sinks.**
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**
Dame, Stoddard & Kendall, Boston, Mass.
Sickels, Sweet & Lyon, 55 Barclay St., N. Y.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Henley, M. O., Richmond, Ind.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Smelting Works.**
Reeves, Paul S., 760 S. Broad, Phila.
- Speaking Tubes.**
Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Konigslow, O., Cleveland, O.
- Speed Indicators.**
Church & Sleight, 103 Fulton St., N. Y.
- Spelter.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**
Boardman, L. & Son, New Haddam, Conn.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, The Wm. Mfg. Co., Hartford, Conn.
Rogers & Hamilton Co., Waterbury, Conn.
- Sporting Goods.**
Hartley & Graham, 313-315 B'way, N. Y.
- Spring.**
American Spiral Spring Co., Pittsburg, Pa.
Cary, Alanson, 240-242 W. 29th St., N. Y.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Nourse, Fred Co., 315 to 319 E. 22d St., N. Y.
Roland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Spring Hinges.**
Bardley, J., 140 & 151 Baxter St., N. Y.
Chicago Spring Butt Co., Chicago, Ill.
Pullman Sash Balance Co., Rochester, N. Y.
Stover Mfg. Co., Freeport, Ill.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Spring Keys and Couters.**
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
- Sprinklers.**
Smith, Oliver A., Clarkston, Mich.
- Stamped Ware.**
Am. Stamping Co., 104 & 106 John St., New York.
- Stamping Works.**
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Fitchener E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
Bristols Mfg. Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**
Dienelt & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia Street, N. Y.
Tretheway Mfg. Co., Pittsburgh, Pa.
- Steam Heating.**
Webster Warren & Co., Camden, N. J.
- Steam Separators.**
Goubert Mfg. Co., 32 Cortland St. N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
- Steel Balls.**
Grant Anti-Friction Ball Co., Fitchburg, Mass.
- Steel, Cold Rolled Strip.**
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**
Krogsrud, W., 61 Fulton, N. Y.
- Steel Importers.**
Abbott, Wheelock & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Milne, A. & Co., 1 Broadway, N. Y.
Newton & Shipman, 88 John, N. Y.
Wetherell Bros., 93 Liberty St., N. Y.
Whitney, A. R. & Co., B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Etna-Standard Iron & Steel Co., Bridgeport, Conn.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Hermann & Co., 108 Duane St. Carls Steel Co., Pittsburg, Pa.
Chester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburg, Pa.
Elken & Co., Hagen, Germany.
Frankford Steel Co., Philadelphia.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Hobson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Kayser, Ellison & Co., Sheffield, Eng.
La Belle Steel Co., Pittsburgh, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburg, Pa.
Moss, F. W., 83 John, N. Y.
Naylor & Co., 45 Wall, N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Ray, J. V., Fort Hunter P. O., Pa.
Rowland, Wm. & Harvey, Frankford, Philadelphia.
Singer, Nimick & Co., Pittsburgh.
Stanley Works, New Britain, Conn.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Taylor Iron & Steel Co., High Bridge, N. J.
Wordlaw, S. & C., Sheffield, Eng.
Wetherell Bros., 93 Liberty, N. Y.
Wilnot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**
Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 B'way, N. Y.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierston & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Montour Iron & Steel Co., Danvers, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tool.**
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, England, or 91 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
- Steel Wheels.**
Lillenberg, M. N., 150 Broadway, N. Y.
- Step Ladders.**
Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.
- Stocks and Dies.**
Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Saunders' Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stove Linings.**
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**
Cheney, S. & Son Manlius, N. Y.
- Stove Trimmings.**
Troy Nickel Works, Troy, N. Y.
- Street Lamps.**
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Strops.**
Electric Cutlery Co., 113 Chambers, N. Y.
J. R. Torrey & Co., Worcester, Mass.
- Strapping Machines.**
Schmitz, E. Lothar, 92 Reade St., N. Y.
- Structural Iron Work.**
Berlin Iron Bridge Co., East Berlin, Conn.
Boston Bridge Wks., Boston, Mass.
Lindsay, Jas. G. & Co., Phila., Pa.
Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**
Atlas Tack Corporation, Boston, Mass.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Nat. Screw & Tack Co., Cleveland, O.
Phillips, E. & Sons, South River, N. J.
Plymouth Mills, Plymouth, Mass.
Trufant, W. E., Whitman, Mass.
- Taps and Dies.**
Patterson & Co., Derby Line, Vt.
Carpenter, J. H., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty, St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
Riehle Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
Riehle Bros. Testing Mch. Co., Phila.
- Theatrical Hardware.**
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
Frost Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.
- Time Record.**
Scattergood, H. W., Phila., Pa.
- Tinners' Hardware.**
Berger Bros., Philadelphia, Pa.
- Tin Plate Machinery.**
Lloyd Booth Co., Youngtown, Ohio.
- Tinware.**
Am. Stamping Co., 104 & 106 John St., N. Y.
- Tire Upsetters.**
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**
Burke, P. F., Boston, Mass.
- Tool Chests.**
Am. Tool Co., 200 W. Houston St., N. Y.
- Tools.**
Britton, Horace E., Stoughton, Mass.
Brown, R. H. & Co., New Haven, Conn.
Frasse Co., 19 Warren St., New York.
Mathew, H. H. Co., Shelburne Falls, Mass.
Millers Falls Co., 93 Reade, N. Y.
Richardson, C. F. & Son, Athol, Mass.
Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, Starrett, L. S., Athol, Mass.
- Tools, Blacksmith and Wheelwrights.**
Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway, Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'**
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasoline.**
Dankster Stone & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.
Standard Lighting Co., Cleveland, O.
- Transom Lifters.**
Wollensak, J. F., Chicago, Ill.
- Trucks, Manufacturers of.**
Berger Bros., Philadelphia, Pa.
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Clark, G. P., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.
- Tubes, Seamless Drawn Copper.**
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
Leng's John S. Son & Co., 4 Fletcher St., New York.
Mannesmann Tube Co. Ltd., Landore, England.
- Tumbling Barrels.**
Henderson Bros., Waterbury, Conn.
- Turnbuckles.**
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
Cleveland Twist Drill Co., Cleveland, Mass.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**
Best, Fox & Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., 71 John, N. Y.
McNab & Harlin Mfg. Co., 56 John N. Y.
Mason Regulator Co., Boston, Mass.
- Ventilator Appliances.**
Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
Newark Mch. Tool Co., Newark, N. J.
- Vises.**
Capital Mch. Tool Co., Auburn, N. Y.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay N. Y.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Wagon Jacks.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
Haskell, Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.
- Water Meters.**
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
Poole, Robt. & Son Co., Baltimore, Md.
- Wheelbarrows.**
Akron Tool Co., Akron, O.
Amer. Steel Scraper Co., Sidney, Ohio.
- Cockburn Barrow & Mch. Co.,** Jersey City, N. J.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lansing Wheelbarrow Co., Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.
Sweet Mfg. Co., Minneapolis, Minn.
- Whips.**
American Whip Co., Westfield, Mass.
- Window Cord, Makers of.**
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
Amer. Spiral Spring Co., Pittsburg, Pa.
Consolidated Steel & Wire Co., St. Louis, Mo.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester.
Wetherell Bros., 93 Liberty St., F. Y.
Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
Barnum, E. T., Detroit, Mich.
Trenton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Eatey, W. S., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Reliance Wire & Iron Wks., Milwaukee, Wis.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Portland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleve'd.
- Wire Cutters.**
Higginum Edw. Co., Higginum, Conn.
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.
- Wire Door Mats.**
Hartman Mfg. Co., Elwood City, Pa.
Horrocks, Joshua, 45 Cliff St., N. Y.
- Wire Fences.—See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Ludlow-Saylor Wire Co., St. Louis.
Ossawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Whitman & Barnes Mfg. Co., Syracuse, N. Y.
Wickwire Bros., Portland, N. Y.
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
Am. Tool Wks., Cleveland, O.
Manville, E. J. Mch. Co., Waterbury, Ct.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**
Adt, John & Son, New Haven, Conn.
- Wire Nails.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilms Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, E. & Sons, South Hanover, Mass.
Phillips, Townsend & Co., Phila., Pa.
Plymouth Mills, Plymouth, Mass.
Salem Wire Nail Co., Salem, O.
Whitney, A. R. & Co., New York City.
- Wire Rods, Steel.**
Consolidated Steel & Wire Co., St. Louis, Mo.
New Castle Wire Nail Co., New Castle, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wolf, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel.**
Makers.
Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Works, San Francisco.
Hasard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.
- Wood-Working Machinery.**
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrenches, Manufacturers of.**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Capitol Mfg. Co., Chicago, Ill.
Central Iron & Steel Co., Brazil, Ind.
Cox Wrench Co., Worcester, Mass.
Kaystone Mfg. Co., Buffalo, N. Y.
Portsmouth Wrench Co., Boston, Mass.
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Barnum, E. T.....	9	Chatillon, John & Sons.....	77	Enterprise Mfg. Co. of Pa.....	78	Holt, Hiram & Co.....	88
Bas Foundry & Machine Works.....	34	Cheney, S. & Son.....	25	Erie Engine Works.....	35	Hooker-Colville Steam Pump Co.....	56
Belden Machine Co.....	41	Chess Bros.....	25	Estey, W. S. & Co.....	13	Horrocks, Joshua.....	12
Bell, Geo. E.....	52	Chester Steel Casting Co.....	26	Ette & Henger Mfg. Co.....	91	Hotchkiss, E. S.....	73
Bellevue Pump Co.....	63	Chicago Spring Butt Co.....	81	Etting, Edw. J.....	18 & 26	Houston, C. B. & Co.....	18
Bement, Miles & Co.....	43	Chrome Steel Works.....	24	Eureka Cast Steel Co.....	160	Howard Iron Works.....	86
Bemis & Call Hardware & Tool Co.....	86	Church, Isaac.....	92	Evans-Friction Cone Co.....	3	Howard & Morse.....	7
Berger Bros.....	86	Church & Sleight.....	34	Eynon-Evans Mfg. Co.....	33	Howson & Howson.....	6
Berlin Iron Bridge Co.....	11	Cincinnati Corrugat'g Co.....	7	F. & N. Mfg. Co.....	90	Hulbert Bros. & Co.....	99
Best, Fox & Co.....	25	Cincinnati Milling Mch. Co.....	52	Fairmount Machine Co.....	51	Hunt, Robert W. & Co.....	52
Bethlehem Iron Co.....	22	Claffen Mfg. Co.....	39	Fearing, Wm. S.....	2	Hurley Bros.....	41
Bevin Bros. Mfg. Co.....	74	Clapp, Geo. M.....	55	Ferdinand, L. W. & Co.....	75	Ideal Mfg. Co.....	75
Bickford Drill & Tool Co.....	50	Clark, H. P.....	89	Field, Alfred & Co.....	68	Illinois Pure Aluminum Co.....	74
Bicycle Step Ladder Co.....	79	Clark & Cowles.....	6	Fitch, W. & E. T.....	99	Indiana Wire Fence Co.....	4
Bigelow, C. R.....	55	Cleveland Block Co.....	82	Fitchburg Machine Works.....	43	Ives, H. B. & Co.....	86
Bignall & Keeler Mfg. Co.....	44	Cleveland City Forge & Iron Co.....	1	Fitzsimons & Co.....	18	Jacobus, W. H.....	92
Billings & Spencer Co.....	86	Cleveland Rubber Works.....	71	Flagg, Stanley G. & Co.....	100	Jarecki Mfg. Co.....	42
Billington, J. H. & Co.....	33	Cleveland Stamping & Tool Co.....	76	Foos Mfg. Co.....	50	Jeffrey Mfg. Co.....	38
Bingham, W. Co.....	75	Cleveland Stone Co.....	52	Forehand Arms Co.....	76	Jenkins Bros.....	1
Birmingham Iron Foundry.....	25	Cleveland Twist Drill Co.....	48	Fraim, E. T.....	2 & 80	Jenkins & Lingle.....	41
Bissell, E. Son & Co.....	57	Clinton Wire Cloth Co.....	8	Frankford Steel Co.....	20	Jenner, H. W. T.....	6
Blake & Johnson.....	13	Cobb & Drew.....	13	Franklin, H. H. Mfg. Co.....	57	Jessop, Wm. & Sons.....	19
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Booth, The Lloyd Co.....	30	Colby Wringer Co.....	79	Garry Iron & Steel Rfg. Co.....	8	Jones, Jesse & Co.....	71
Borden & Lovell.....	7	Coldwell Lawn Mower Co.....	90	Gartland Foundry Co.....	30	Jones & Lamson Machine Co.....	58
Borgner, Cyrus.....	30	Colliau, Victor.....	89	Gautier Steel Department.....	16	Kayser, Ellison & Co.....	19
Boston Bridge Works.....	16	Conroy, P. J. & Co.....	29	Gaylord, F. L. Co.....	89	Keeley, Jerome & Co.....	18
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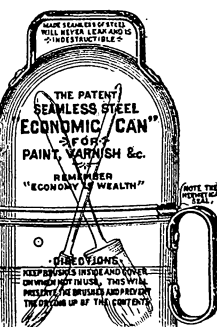
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Bronze Metal Spring Hinges.

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THE IRON AGE

THURSDAY, OCTOBER 12, 1893.

The Bristol Recording Voltmeter for Alternating and Direct Current.

For some time there has been a demand in electric light and power stations for a voltmeter which would make a continuous record day and night of all changes of voltage. It has been shown by tests that the life and efficiency of incandescent lamps are greatest when the voltage is evenly maintained. When it rises above that for which the lamps were designed, even though the lamps may not be burnt out, they are liable to be seriously injured. If voltage falls below the normal, the result is deficient

with the special feature of the moving coil being mounted on frictionless spring knife edges, renders the instrument extremely sensitive to the smallest changes of voltage. The marking arm F is attached directly to the spring E, and partakes of its motion, recording the changes of voltage on a uniformly revolving chart. It will be observed that the instrument is constructed on the electric balance principle without permanent magnets.

The divisions on the chart are on an increased scale in the vicinity of the voltage to be maintained, thereby making it possible to note the variation of one volt. The chart shown in Fig. 1 is

Combustion at the Tuyere Level.

W. Van Vloten has discussed in *Stahl und Eisen* the way in which the combustion proceeds immediately in front of the tuyeres in a blast furnace. Many points, he observes, are in doubt. For instance, it is not known how far the oxygen of the blast penetrates into the furnace, whether the carbon of the fuel is at once completely converted into carbonic anhydride, or whether it is carbonic oxide that is produced. Then, again, the influence exerted by the different temperatures of blast and by varying conditions in the nature of

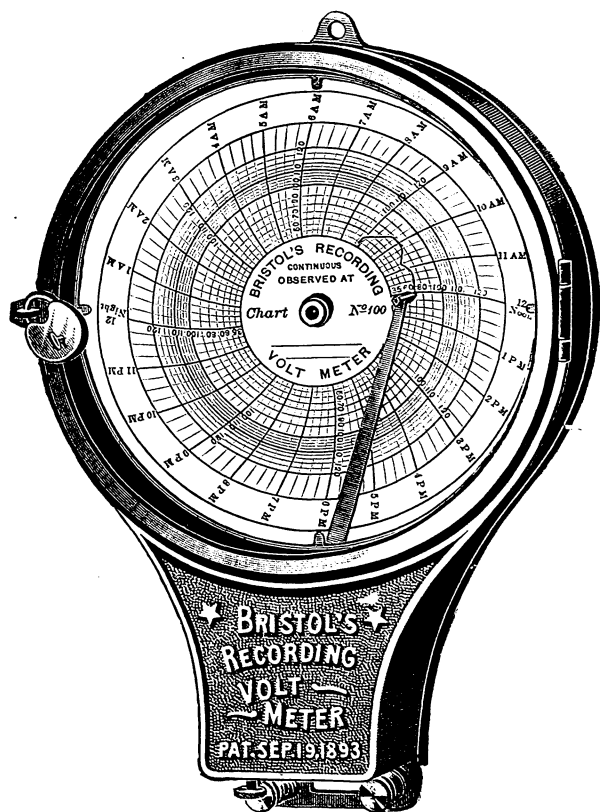


Fig. 1.

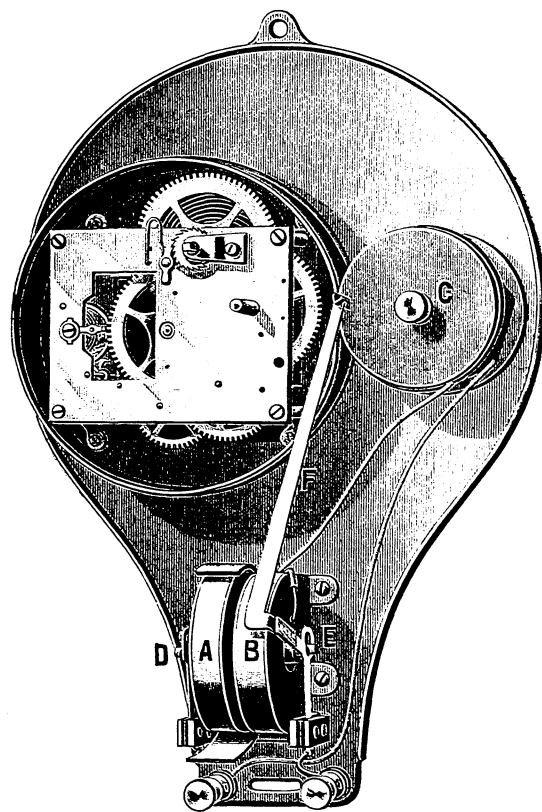


Fig. 2.

THE BRISTOL RECORDING VOLTMETER FOR ALTERNATING AND DIRECT CURRENTS.

illumination and dissatisfaction of consumer.

In the accompanying engravings we illustrate a new recording voltmeter which is being manufactured by the Bristols' Mfg. Company of Waterbury, Conn. This instrument has been designed with a special view to being fundamentally simple in construction, extremely sensitive and accurate in its operation.

Fig. 1 represents the voltmeter ready for connection. Fig. 2 shows the interior construction. The coil A is mounted on the spring knife edge supports D and E, and is free to move toward the parallel and stationary coil B when they are mutually attracted to each other by a current passing in series. The current is conducted to the movable coil A through the supporting springs D and E, and this, together

intended for a 110-volt circuit, but the instrument is equally well adapted to any other desired range of voltage, as, for instance, one of 600 volts for electric railway work. The coil C is an auxiliary resistance. With the alternating current voltmeter the auxiliary resistance is furnished in a separate rheostat, which may be adjusted to suit the rate of alternations of the current to be measured. Several of these voltmeters have been in use in large electric light stations for the past three months, and are giving the highest satisfaction. At the World's Columbian Exhibition the company have one of the instruments in operation at their exhibit in Machinery Hall and one in Electricity Building. Two of the voltmeters are being used by the Committee on Awards in connection with the life tests of incandescent lamps.

the fuel are still matters of doubt. With a view to elucidate this question, the author withdrew, by means of a cooled copper tube, portions of the gas both from the immediate vicinity of the tuyere nozzle and from various parts of the crucible portion of the furnace, both above and between the tuyeres. A drawing of the fusion zone of the furnace in which these tests were made accompanies the description. Most of the tests were made during the normal working of the furnace, which ran on basic Bessemer iron, the furnace having a daily out turn of about 130 tons. For every 1000 parts of pig iron made there was charged on an average 929 to 940 parts of coke, containing 9.5 to 10 per cent. of ash, 600 parts of bulldog and scale, 1780 parts of ore and 620 parts of flux. The blast was blown at a pressure of 5 pounds through five

tuyeres 4.72 inches wide in the clear, and at a temperature of from 650° to 750° C. Some of the tests were made when a gray basic Bessemer pig iron was being made which contained 2 per cent. of silicon. Of this metal the furnace made 100 tons a day, with a coke consumption of 20 hundredweight per ton of pig iron made. The tuyeres were in this case 4.32 inches wide; otherwise the conditions were identical with those referred to above. Some other tests were made when the furnace was running on a white iron containing 5 per cent. of manganese. The results of the analyses are tabulated by the author, and they show that while the combustion is very intense it is confined within a very small space. Despite the fact that the blast on entering the furnace had a velocity of 820 feet per second, the maximum distance from the tuyeres at which oxygen could be detected was only 2 feet. Various tests made at a distance of 24.8 inches above the tuyeres in no case showed any free oxygen. The results further showed that even when using blast of a very high temperature the oxygen of the blast was first converted into carbonic anhydride before any carbonic oxide was formed. Oxygen and carbonic oxide together were only found in 3 of the 46 experiments, the results of which are tabulated, and even then only in very small quantities. It is otherwise with hydrogen, the presence of which was observed in every instance, even when much free oxygen was also present. The ratio observed between oxygen and nitrogen was never identical with that existing between these gases in air, the oxygen being always present in smaller quantity, due, no doubt, to the oxidation before the tuyeres of elements other than carbon—such, for instance, as silicon, manganese, iron and phosphorus. Indeed, it may be considered that in the crucible portion of the blast furnace there is an oxidizing zone immediately in front of the tuyeres and a reducing zone directly above this oxidizing one. The author further shows that the sinking of the charge in the blast furnace is probably a very irregular movement, and to this he attributes the hanging of charges.

California Midwinter International Exposition.

The Department of Publicity and Promotion of the California Midwinter International Exposition issue, from the California State Building, World's Fair, Chicago, a circular letter in regard to the exposition to be opened in San Francisco, Cal., on January 1, and to which we referred last week. The directors of the California enterprise believe that its success is assured, and that there is no doubt of a large attendance of visitors from foreign countries and the American States other than those bordering on the Pacific Coast, judging from the interest taken by World's Fair visitors in the proposed undertaking. The railroad companies have promised to make a one-fare rate for the round trip, thus bringing the cost of a visit to the Golden Gate within reasonable reach of many who could not otherwise hope to get so far afield. In reference to the plan and scope of the exhibition, the managers observe that although the California Fair will not be as great in size as the Columbian Exposition it will be thoroughly international in character, and will show all that is best in the art, science and industry of the world.

Some of the best and most interesting exhibits in each department of the World's Fair will be removed from Chicago to San Francisco at its termination, in addition to which many novel and original displays will be made. A Midway Plaisance is to be as prominent a feature of the fair as that of Chicago, and many of the best displays from that place will go on to San Francisco, while a number of novelties are to be introduced. Foreign countries have been invited to co-operate through their commissioners, and we understand are entering heartily into the scheme.

The Foundrymen's Association.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, on Wednesday, October 4. The chair was occupied by Thos. Devlin of Thos. Devlin & Co., Philadelphia. In the absence of the secretary, Howard Evans, the duties of that official devolved upon H. C. Vansant of Morris, Tasker & Co., Incorporated, Philadelphia. The minutes of the last meeting were read and approved. The Executive Committee made no report, as there had been no meeting of that body since the last meeting of the association.

Mr. Vansant read a letter received from Professor MacAlister of the Drexel Institute, Philadelphia, in regard to the arrangement for chemists' services discussed at the last meeting, in which was expressed a belief that arrangements could be made at the institute for the making of determinations on satisfactory terms.

Mr. Vansant also read a letter from Congressman Bingham, acknowledging receipt of a copy of the resolution passed by the association at its July meeting, and stating that he was in full accord with the policy therein expressed in regard to the repeal of the silver purchasing clause of the Sherman act.

L. B. Whitney of A. Whitney & Sons, Philadelphia, representing the car wheel section of the Price Committee, reported that prices were never lower than at present.

There were no reports from the remaining sections of the committee.

Stanley G. Flagg, Jr., of Stanley G. Flagg & Co., Philadelphia, reported that he had had an interview with Professor Spangler of the Mechanical Engineering Department of the University of Pennsylvania, at which the professor stated that, in response to a letter he had received from the secretary of the association, he had taken up with Professor Smith the question of undertaking analytical tests for the members of the association. Professor Smith said that the university would be only too glad to aid the association in any way possible, but at present their laboratories were full, and if an additional force was required extra expense would be incurred. Professor Spangler intimated that, in the event of the work being done at the university, no profit would be expected; but charges, simply sufficient to cover expenses, would be made, and that the association should guarantee the expenses of the work, to the extent of say \$650 per year, of which amount \$500 would be applied in payment for the services of a man who would be at the disposal of the association at all times, and the remaining \$150 would be used for incidental expenses. It was estimated that the entire expense would amount to about \$650. He (Mr. Flagg) told Professor

Spangler that the association was not yet ready to act in the matter, but that he would report the suggestion to this meeting. As far as mechanical tests were concerned Professor Spangler said that if samples were sent to his department he would willingly make any test required, free of any charge whatever, and that he should consider such calls upon his department favors to himself. The employment of a man especially for the work of making tests was, the professor thought, rendered necessary by the fact that, when samples were sent to the department for analysis, analyses would be required the same day as sent; and in case all the young men in the department were employed on other analytical work, which could not be left, the service would be unsatisfactory. By employing a man exclusively for the work tests could be made promptly. Professor Smith had hoped to be present at this meeting to discuss the matter, but another engagement prevented his attendance.

Upon motion it was resolved that personal invitations be sent to Professors Smith, Spangler and MacAlister to be present at the next meeting of the association for the purpose of further discussing the matter.

Mr. Vansant read a letter from the secretary of the Western Foundrymen's Association, dated September 25, stating that at a meeting of that association held the previous Wednesday it had been decided that if possible and advisable their October meeting would be held in the rooms of the Associated Engineering Societies in the Mining Building at the World's Fair, in which case an effort would be made to have the day of the meeting recognized as an official "Foundrymen's Day" by the exposition, and to have the Mining Building open in the evening; that arrangements would also be made to have one or two important papers read; that invitations would be sent very widely throughout the West, and the Philadelphia organization would be invited to attend, and asking how many founders from the Philadelphia district would attend, and for suggestions regarding the plan.

As Mr. Evans, the secretary of the association, was in Chicago, a motion was made that the matter be referred to him with instructions to do what in his judgment he considered best in the interests of the association; and that Mr. Whitney be directed to write to Mr. Evans informing him of this arrangement.

Dr. Edward Kirk then delivered the following address on "Fluxing:"

Fluxes.

Fluxes is the name or term applied to a substance which imparts igneous fluidity to metals when in a molten state, and has the power to separate metals contained in metallic ores from the non-metallic substance with which they are found in combination, and also to separate from metals, when in a fluid state, any impurities they may contain. Fluxes are also used for the purpose of making a fluid slag in furnaces to absorb the non-metallic residue from metals or ores and ash of the fuel and removing them from the furnace to prevent clogging and keep the furnace in good working order. The materials used as fluxes for the various metals consist of mineral, metallic and chemical substances found suitable for separating metals from their ores and cleansing them of impurities, and are numerous and varied in nature and composition. But this evening we shall only consider those employed in

the production of iron and the melting of iron for foundry work. The mineral substances employed for this purpose are numerous, but they consist principally of the carbonate of lime in its various forms, the principal one of which is limestone.

Foundrymen long ago conceived the idea of using limestone as a cupola flux. In many foundries it is the practice to use a few shovels or a few riddles of finely broken limestone in the cupola on the last charge of iron, or distributed through the heat a few handfuls to each charge of iron. The object in using limestone in this way is not to produce a slag to be drawn from the cupola, but to make a clean dump and a brittle slag or cinder in the cupola that can be easily broken down and chipped from the lining when making up a cupola for a heat. Limestone used in this way does not produce a sufficient quantity of slag to absorb the dirt from the iron and ash of the fuel and keep the cupola open and working free, but rather tends to cause bridging and to reduce the melting capacity of the cupola. The making of a brittle cinder in a cupola by the use of limestone depends to a great extent upon the quality of the stone. The results obtained from the use of limestone in small quantities in a cupola are so uncertain that I do not think they justify a foundryman in using it.

The tendency of slag or cinder in a cupola is to chill and adhere to the lining just over the tuyeres and prevent the proper working of the furnace. So great is this tendency to bridge that a small cupola will not melt properly for more than two hours and a large one for more than three hours. To overcome this tendency to clog and bridge foundrymen in many cases have adopted the blast furnace plan of using a large percentage of limestone as a flux in their cupolas and tapping slag.

When a large percentage of limestone is charged it forms a fluid slag. This slag settles through the stock to the bottom of the cupola, and in its descent absorbs the ash of the fuel and dirt or sand from the iron and carries them to the bottom of the cupola, where the slag and dirt it contains may be drawn off and the cupola kept in good melting order and in blast for days at a time.

The amount of limestone required per ton of iron to produce a fluid slag depends upon the quality of the stone, the ash of the fuel and the condition of the iron to be melted. It is the custom in some foundries where the sprues and gates amount to from 30 to 40 per cent. of the heat to melt them without milling to remove the sand, and to use enough limestone in the cupola to produce a sufficient quantity of slag to absorb and carry out of the cupola the sand adhering to them. In this case a larger percentage of limestone is required than would be required if the sprues and gates were milled and only clean iron melted. Poor fuel also requires a greater amount of slag to absorb the ash than good fuel, and a lean limestone must be used in larger quantities than a stone rich in lime. The quantity required to produce a fluid slag amounts to from 25 to 100 pounds per ton of iron melted. The weight of slag drawn from a cupola when the sprues and gates are not milled and the cupola is kept in blast for a number of hours is about one-third greater than the weight of limestone used. When the sprues and gates are milled the weight of the slag is about equal to the weight of the limestone. When the cupola is only run for a short

time and slag only drawn during the latter part of a heat the weight of slag is less than the weight of the limestone. The slag drawn from a cupola has been found by chemical analysis to contain from 4 to 7 per cent. of combined iron and numerous small particles of shot iron mechanically locked up in the slag, which cannot be recovered except at a greater cost than the value of the iron. In a number of tests made in the same cupola to ascertain the percentage of iron lost in melting when the cupola was slagged and when it was not slagged, I found the loss of iron to be from 3 to 4 per cent. greater when the cupola was slagged.

Effect of Flux Upon Iron.—Many of the limestones and other mineral substances employed as cupola fluxes contain more or less finely divided oxides, silicates, &c., in combination with earthy materials. The conjoined effect upon iron of these diffused impurities in a cupola is to prevent the metal from running clean in the mold or making sharp, sound castings, and the tensile and transverse strength is frequently impaired by them. The tendency of the cupola furnace is to clog and bridge over the tuyeres, and concentrate the blast upon the iron through a small opening in the center and injure its quality. If by the free use of limestone we prevent bridging and keep the furnace working open and free we avoid injuring the iron in melting by the concentration of a strong blast upon it. The effect, therefore, of limestone in a cupola is not to improve the quality of iron, but to prevent its deterioration in melting.

The Action of Fluxes on Linings.—Limestone and other minerals employed as fluxes frequently contain impurities which enter into combination with the lining material of a furnace and render it fusible. This fact was fully illustrated at the foundry of John D. Johnson & Co., Hainesport, N. J., a few weeks ago. The cupola front had been put in with new molding sand for a long time and no flux used in the cupola. The sand made an excellent front that resisted the action of the heat and molten iron upon it. As the heats enlarged it became necessary to use flux and top slag to run off the heat. Oyster shells were used and produced a slag that flowed freely from the slag hole and had no effect upon the sand in the front. When the supply of shells became exhausted a limestone was used in place of them. Trouble then began with the front. It was melted by the flux into a thick tough slag that settled down and closed up the tap hole, and the iron could only be drawn by cutting away a large portion of the front to enlarge the tap hole. Mr. Johnson called at my office to learn what could be done to keep the tap hole open. I advised that the front material be changed and a mixture of fire clay and sharp sand be used instead of molding sand. This was done and there was no further trouble in keeping the tap hole open and in good order to run off the heat. This serves to illustrate the effect of fluxes upon lining material.

From the various qualities of cupola brick and lining material now in the market a lining may be selected that will resist the action of almost any flux or slag, and foundrymen may select a flux to suit the lining or a lining to suit the flux, whichever they find it to be the most profitable in their locality.

How to Slag a Cupola.—Foundrymen sometimes experience trouble in slagging their cupolas. This is largely due to lack of knowledge in charging the

limestone and drawing the slag, for any cupola can be slagged if properly worked. To draw slag from a cupola a sufficient quantity of limestone or other slag producing material must be charged in the cupola with the iron to make a fluid slag. The exact amount required can only be learned by experimenting with the fluxing material used, but is generally from 50 to 60 pounds of good limestone per ton of iron when the remelt is not milled. The limestone is generally charged on top of the iron, and is put in with each charge after the melter begins using it. No limestone is used with the iron on the bed or first few charges of iron. In small cupolas limestone is generally charged with the second or third charge of iron. In large cupolas, when the charges of iron are light, six or eight charges, or generally about one-sixth of the heat, are charged without limestone. This is the way limestone is used when the cupola is run in the ordinary way for a few hours. When the cupola is run for some special work the limestone is charged in a number of different ways.

The slag is drawn from the cupola through an opening known as the slag hole. This opening is made through the casing and lining under the lower level of the tuyeres, and at a point in the cupola where it will be out of the way in removing iron from the spout and convenient for removing the slag. The height the slag hole is placed above the sand bottom depends upon how the iron is drawn from the cupola. When it is desired to hold iron in a cupola until a sufficient quantity is melted to fill a large ladle the slag hole is placed high, and when the iron is drawn as fast as melted the slag hole is placed low.

When a slag hole is placed high slag can only be drawn as the cupola fills up with iron and raises it to the slag hole. When the iron is withdrawn from the cupola the slag falls, and the slag hole is closed with a bod to prevent the escape of the blast.

When the iron is withdrawn from a cupola as fast as melted the slag hole is placed low, and when opened it is permitted to remain open through the remainder of the heat. This is the best way of drawing slag from a cupola, for the flow of the slag is regulated by the amount of slag in the cupola, and if the hole is not made too large there is no escape of blast. The slag in the bottom of a cupola takes up impurities from the fuel and iron, and if permitted to remain in the cupola for too long a time it may become so thick that it will not flow from the slag hole; or it may be filled with impurities, become overheated, boil up and fill the tuyeres with slag, and when boiling it will not flow from the cupola through a small slag hole. The time for drawing slag from a cupola is, therefore, a matter of great importance. The slag hole is generally opened in from half an hour to an hour after the cupola begins to melt, and when placed low is permitted to remain open through the remainder of the heat. When placed so high that slag can only be drawn when the cupola fills up with molten iron it should be opened as soon as the slag begins to rise and closed as soon as it falls below the opening.

Does it Pay to Slag a Cupola?—Nothing is gained by slagging a cupola when the sprues and gates are milled and the heat can be melted successfully in the cupola without slagging. But a great saving in labor and wear and tear of machinery can be effected in many foundries by melting

the sprues and gates with the sand on, and slagging the cupola to carry the sand out and keep the cupola working free. A cupola cannot be made to melt iron faster by slagging than it can without slagging, but it can be kept in blast and in good melting condition for a greater length of time and a much larger amount of iron melted by slagging. Foundrymen who find their cupolas temporarily too small to melt the quantity of iron required for their work can overcome the difficulty by slagging the cupola and keeping it in blast for a greater length of time. In endeavoring to make an estimate of the cost of slagging a cupola I found that the cost of limestone in different localities varied from 50 cents to \$3 per ton. The amount used varied from 25 to 100 pounds per ton of iron melted. The amount of slag drawn varied from 25 to 100 pounds of iron. The iron combined with the slag varied from 4 to 7 per cent. With the wide differences in the cost and quality of limestone used and the difference in the quantity of slag drawn and percentage of iron it contained, I found it impossible to make an estimate that would be of any practical value to foundrymen. Such an estimate must be made at each foundry to be of any practical value.

Oyster, clam and other shells are frequently used as a flux in place of limestone in localities where they can be procured at a less cost than limestone. The shells are charged in the same way as limestone and in about the same proportions to the iron. They may be used in place of limestone, either in large or small quantities, and have about the same effect upon the iron and cupola as limestone. When used in large quantities they produce a fluid slag that keeps the cupola working free and flows freely from the slag hole, carrying with it the refuse of melting that clogs a cupola.

Marble is another of the carbonates of lime and the spalls or chippings from marble quarries or works are quite extensively used in some localities as a cupola flux.

There are a number of other minerals such as fluorspar, feldspar, quartz rock and numerous chemical compounds that are used as cupola fluxes, but I will leave these for consideration at some future time.

Upon the conclusion of his address Dr. Kirk was tendered a vote of thanks. Asked whether there was any difference in the amount of fuel required, Dr. Kirk stated that there was no practical difference. The amount of fuel used in a cupola was very uncertain, and it was a hard matter to determine whether more was required or not.

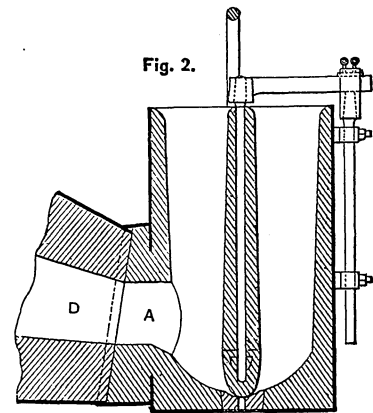
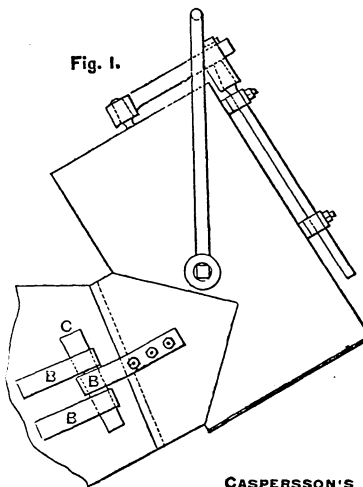
P. D. Wanner of the Mellert Foundry & Machine Company of Reading, Pa., then addressed the meeting at length upon the present condition of the trade and the wages question. In the course of his remarks he said it was well known that for a period of five years, or since 1887, as far as the cast iron pipe trade was concerned, and probably the foundry business generally, there had been a depression, and during these years losses and lack of profits had been suffered by the manufacturers. Every cut on prices had been met until there was nothing left to cut on, but the price of labor had remained the same. Labor had not suffered until within the last four or five months. During the recent financial stringency and panic there had been a reduction in labor at a great many places all over the country. Employers, as a rule, he said, found it a most unpleasant proceeding to reduce wages.

It was the feeling he had and it seemed to be shared by all with whom he had spoken on the subject. It was unpleasant to the employer as an individual and disagreeable to the community. Everybody talked about it and sought to hold up the employer as an example of tyranny and an oppressor of the poor, and so forth. But, he said, when times such as experienced during the last few months were met a great many employers had been compelled to reduce wages and the working people had had to submit, and did so cheerfully. Now, after all, it seemed to him a question whether it was good policy to reduce wages or whether there had been a real necessity for it. Unless the reduction was considered necessary in order to prevent importation or competition with foreign labor he doubted very much the policy or necessity of it. He believed that if overproduction was the cause of depression in business it was not good policy to reduce wages, and that it was not the remedy to apply. It would be better to shut down those particular branches of trade where overproduction was present, and let the

The Bessemer Process as Conducted in Sweden.—III.*

BY PROF. RICHARD AKERMAN, STOCKHOLM, SWEDEN.

Besides the actual waste given above, there was, down to 1880, a loss of 2 or more per cent., due to the formation of ladle skulls; but this trouble was luckily obviated by Caspersson's converter ladle,† so-called, which, since the date mentioned, has been used with the greatest success at the majority of the Swedish Bessemer works. This arrangement, illustrated in Figs. 1 and 2, consists of a narrow ladle, which is furnished low down on the side with a lateral opening A, that fits the mouth of the converter D. Immediately after the blow the ladle is brought up to the converter mouth and made fast by means of wedges, C, in the lugs B (see Fig. 1). The converter is then turned down still further, so that its position is as indicated in Fig. 2, and a part of the bath of metal runs into the converter ladle, while most of



CASPERSSON'S CONVERTER-LADLE.

working people find other avenues of employment. Wages, he was inclined to believe, should be maintained to the last, and he did not think the necessity had arisen for a reduction of wages in this country. After reference to the tariff question, in which he attributed the overstimulation of business to a high tariff, he said in conclusion, that the higher wages could be kept the more prosperous the country would become.

A general discussion followed. The chairman doubted whether if an advantage was gained by a reduction in wages, such advantage would not be given to the customer.

Mr. Whitney thought prices were regulated by the ratio of supply and demand. The chairman said the position of supply and demand was claimed to be an old doctrine, and in Pennsylvania the idea was scouted altogether. As Mr. Wanner had said, he could not see any reason for manufacturers cutting wages to compete with one another. That is what it would amount to, and if an advantage was obtained it would be given to the customer.

The trend of the discussion was toward a possible arrangement for a uniform scale of wages in the foundry business, and finally, on motion, the matter was referred to the standing committee.

The meeting then adjourned.

the metal remains in the converter. It is precisely on this circumstance, coupled with the smaller depth of bath occasioned thereby, that the advantages of the converter ladle depend. A ladle, being never as hot as a converter at the end of a blow, operates, therefore, always to chill; but as the converter ladle is quite small, its power to chill the metal bath, the incomparably larger part of which remains in the converter after it has been turned down, is far less than that of an ordinary ladle, which receives all of the molten mass.

The result is that the liquid Bessemer metal can be allowed to remain in peace and quiet longer, to permit the gases to escape, and without fear of partial freezing before being tapped into the molds, than before the advent of the converter ladle; at least, longer than was possible with a product only as moderately hot as the Swedish Bessemer metal generally is, especially since the quantity handled in Sweden at each blow, as has been shown, is comparatively very small, and consequently the cooling effect of the ladle

* Read before the American Institute of Mining Engineers. Translated by Philip W. Moen and Emanuel Trotz, Worcester, Mass. Chicago meeting, being part of the International Engineering Congress, August, 1893.

† *Jernkontorets Annaler*, 1880, p. 471, and *The Journal of the Iron and Steel Institute*, 1880, ii, p. 599.

is proportionally great. By the aid of the converter ladle, ladle skulls, formerly so common here, can be prevented. But to this great advantage may be added another—viz.: That the product is somewhat freer from blow holes, partly because with the converter ladle a longer time is given for the escape of the gases and for the more complete separation of the slag by rising to the surface, and partly on account of the more moderate speed of

the blow. If the temperature has been too high, as when temperature No. 2 instead of No. 1 has been employed, and there is reason to fear surface blow holes in the ingots, this serious detriment can be somewhat lessened only by allowing the product so to cool before being tapped that it then has the same heat as that which ordinarily prevails with temperature No. 1. If this is to be attained only by letting the metal stand longer in the ladle before being

converter ladle with a so-called strainer funnel, illustrated in Figs. 3 and 4.

The plate iron funnel *b*, furnished with the handle *a* and lined with refractory material, has the easily withdrawable chamotte bottom *c*, which is provided with many larger or smaller holes, the number of which is larger in the same degree as their diameter is smaller. When teeming takes place there is first laid upon the mold *d* a cast iron disk, *e*, with an opening in the middle, *f*, corresponding in size to the changeable funnel bottom, and a little side hole, *g*, which affords a chance for the gases separated during teeming to escape, and also for the man who directs the tapping to judge when the molds have been suitably filled. The preheated funnel is placed over the central opening *f*, and the metal, tapped out through the converter ladle into the strainer funnel, is divided by means of the holes in the bottom into more or less numerous streams of smaller or larger size. This division of the metal occasions during its passing down into the mold both a more complete removal of gases and greater cooling than takes place in the ordinary mode of tapping. The finer the strainer holes, the more effective does its work become. There should be, therefore, at least two different kinds of strainer bottoms at hand, one with larger and the other with smaller holes, and the choice between them can be made according to the temperature of the blow. After an unusually hot blow a bottom with smaller holes is taken; and if the temperature during the blow has been just hot enough no strainer at all is used.

It might be supposed that the division of the metal into many fine streams would be likely to be dangerous by reason of the risk of partial oxidation with accompanying red shortness; but experience shows that this is prevented by the gases which escape from the metal and speedily fill up the mold covered by cap *e*, thus hindering the contact of the streams with the air.

Although too high a temperature produced during the blow can be suitably lowered by means of the converter ladle and the strainer funnel without fear of making scrap, the higher proportion of silicon and manganese in the product incident to an overhot blow cannot be thus remedied. This can be regulated to a certain degree by the practice employed in other countries of adding cold steel scrap during the blow; but the method of Mr. Caspersen in this connection is still more effective—namely, to charge finely crushed rich ore during the blow; for, besides the chilling which the addition of cold ore occasions directly, it causes an indirect cooling through the considerable absorption of heat involved in the reduction of the iron ore.

By a proper use of these aids the blower, if he can judge the temperature accurately enough, can attain surprising uniformity, even in Bessemer products. This is particularly necessary in a country where most of the Bessemer steel made is used for purposes for which crucible steel is usually required elsewhere.

The Swedish plan of not recarburizing to any considerable extent, but of blowing approximately direct, must, of course, be accompanied by difficulties in deciding when the blow should end, which are greater than those attending the usual course of continuing the blow till the metal is fully decarburized and afterward, by means of different additions, recarburizing to the desired hard-

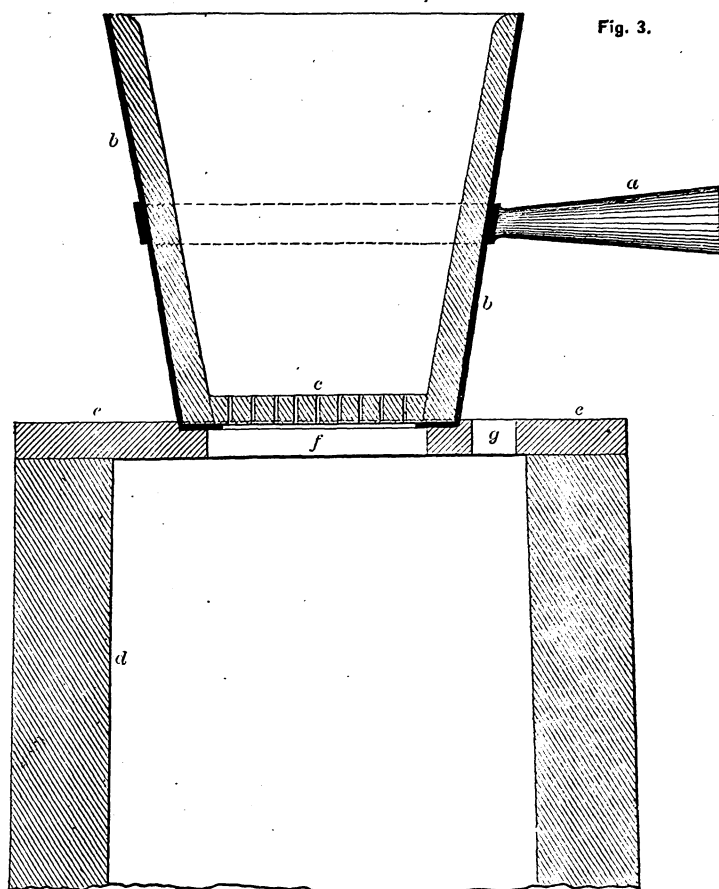


Fig. 3.

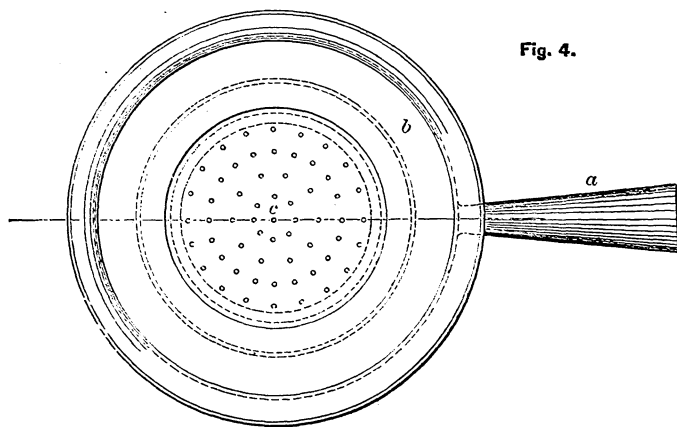


Fig. 4.

CASPERSEN'S STRAINER-FUNNEL

the stream of metal incident to the smaller depth of bath.

Since the converter ladle, during teeming, is fast and immovably fixed to the converter, it is evident that the former cannot, like an ordinary crane ladle, be carried over the molds, but that the molds must be brought under the converter, either on cars or on a turntable.

As has been mentioned already, the formation of blow holes in ingots stands in the most intimate connection with the temperature that prevails during

tapped into the molds, there is danger with us of ladle skulls, and sometimes even of the partial closing up of the nozzle, together with the spurting stream occasioned thereby; and this, in turn, gives ugly and faulty ingots. The danger of these disadvantages is certainly very decidedly diminished by the converter ladle; but even with its assistance one cannot always make use with safety of as warm a blow as would be desirable for the complete prevention of red shortness. To meet this difficulty Mr. Caspersen has complemented his

ness. No skill is needed to end the blow, if it is to be prolonged till the drop of the flame becomes conspicuously evident. Quite different does the problem become when the blow for the production of steel must be interrupted while the carbon flame is still so copious that changes in its size can scarcely be detected.

In these earlier stages no great assistance can be had from the spectroscope, because it is only when carbon is so reduced that one can take note of the diminishing of the flame that the changes in the spectra first become sufficiently apparent to be a sure guide by which to judge of the degree of hardness. Hence, although the spectra of the Bessemer flame were scientifically examined in Sweden as early as the beginning of the decade commencing in 1860, the spectroscope has never come into general use here for this purpose.

That by which the Swedish Bessemer blower most guides himself during the blow in producing steel of the higher carbons is, in reality, the character of the sparks, and many a Bessemer blower has acquired a marvelous skill in this direction, when the great difficulties are taken into account. Nevertheless, with a view to prevent faulty blows it has become more common in the course of time for the blower to turn down the converter immediately before he considers the right point reached, to convince himself by a hasty hammer test whether the degree of refining has been judged correctly or not, and then to continue the blow for a few seconds. In producing ingot iron, on the contrary, no such tests are required, and one judges, as has been said, by the flame.

As the Swedish Bessemer metal contains, in comparison with that made elsewhere, relatively little of any elements other than iron and carbon, it is natural that in this country the degree of hardness should have been determined by the contents of carbon, more especially since the colorimetric method of carbon determination, worked out by Professor Eggertz, furnished so easy a means for a quick and generally satisfactory determination of the carbon in the Bessemer product. But besides the colorimetric determination of carbon, which is never omitted in Sweden, the product of every blow is subjected to a hammer test, to determine not only the degree of hardness, but also how far the product is free from red shortness.

Discussion.

When the metal is intended for purposes of construction (which is not as common in Sweden as it is elsewhere, since a very considerable part of the Swedish Bessemer product is used for tools and the like) it is, of course, subjected to the usual mechanical tests.

In the discussion J. Hartshorne of Stowe, Pa., said: Unfortunately for myself, I can only speak from personal experience upon one part of Professor Akerman's paper—namely, the effect of the temperature at which the molten metal is cast upon the quality of the finished steel.

In a general way I have, of course, known for a long time that the colder the metal was cast, provided it ran cleanly out of the ladle, the better the ingot would be. It has only been, however, since I have been engaged in the manufacture of soft steel by the basic Bessemer process that the extreme importance of temperature in casting has been forced upon me.

As the grade of steel made becomes softer the range of permissible temperature becomes smaller, and the necessity

of keeping within it becomes greater. It is very difficult to convey an idea of temperature when there is no means of measuring it, but a rough scale can be formed from the amount of skull left in the ladle.

At Pottstown, our heats generally weigh 24,000 pounds of steel, and are poured either into four ingots of 6000 pounds or six ingots of 4000 pounds each. The time occupied in casting is from 15 to 22 minutes. We use two sizes of nozzles, one of which is 1 inch in diameter and the other is 1½ inches. In making ordinary soft steel, containing carbon from 0.10 to 0.15 per cent., phosphorus 0.05 to 0.07 per cent., sulphur about 0.05 per cent., and manganese from 0.30 to 0.40 per cent., there is quite a range of temperature throughout which good results can be obtained. This grade of steel we cast through 1½-inch nozzles in from 15 to 18 minutes. The results seem to be about the same if the steel, during casting, is somewhat hotter than enough to leave the ladle clear of skull or if it is cold enough to leave a skull of from 600 to 800 pounds. There is, however, enough variation to warrant belief that a temperature which leaves about 200 to 400 pounds of skull in the ladle is the best. Of course, it is understood that the casting is done just as slowly as possible in all instances.

In making very soft steel, however, the permissible range is much less. Such steel will contain 0.07 to 0.10 per cent. of carbon, 0.01 to 0.03 of phosphorus, below 0.04 per cent. of sulphur, and from 0.10 to 0.20 manganese. The softest I have seen was C = 0.09, S = 0.031, P = 0.015, Mn = 0.095. For such steel the 1-inch nozzle is the best, provided it can be kept open and clean. The casting through the 1-inch nozzle takes about 20 minutes. The best results are obtained when there remain from 200 to 500 pounds of skull in the ladle.

There is no trouble in making the above steel in the converter, provided the proper temperature be obtained in casting. It will roll perfectly, without the slightest trace of red shortness. It will go through the mechanical tests to which we submit every heat of steel with perfect success. These tests I have described in my paper, read at the Reading meeting of the institute, October, 1892, and it is not necessary to describe them again. It will be remembered that they are very searching for brittleness, red shortness and general soundness.

On the other hand, if the steel be poured when too hot the blooms and billets will have surface cracks and striations, and will have great tendency to open up and tear in rolling. The ingots when investigated have invariably shown the blow holes in great number very near the surface. It has sometimes happened that an ingot from a heat which has been cast too hot has been taken from the heating furnace and has been allowed to cool off. In such cases the surface of the ingot has been deeply pitted all over, showing that the blow holes open through the outer skin.

The mechanical tests of such heats show precisely the same characteristics. Another peculiarity is that the tests show much more brittle steel than when the casting has been done at the proper temperature. When the casting of this dead soft steel has been skillfully done the tests show an absolutely dead soft, homogeneous and solid metal. The surfaces and edges are without cracks,

checks or flaws of any kind, and the fractures are perfectly solid and fibrous (so-called).

If the steel has been cast too hot the bending tests will show cracks at the bends, the surfaces will show hair cracks and striations, the edges will show cracks and flaws, and the ear tests will have many of the indications of red shortness, while the fractures will show an open, porous and "stringy" metal. These characteristics show themselves in the finished product, but to a less marked degree.

I have not yet been able to fully satisfy myself as to all the reasons for such different results being obtained from steel of practically identical composition as shown by the analyses. There is no doubt, however, that the surface blow holes described by Mr. Caspersson play the most important part in causing them. Sometimes, though very rarely, the metal contains too much oxide, but this is very easily recognized by the fractures of the tests. In such cases the undue temperature has evidently been caused by overblowing. It is evident, therefore, that the temperature plays a very important part in the manufacture of the softest grades of steel, and that the greatest care must be exercised in controlling it.

The same rule applies in the casting of open-hearth steel, but the permissible range of temperature is greater. This, of course, arises from there being less gas contained in steel made in the furnace. It is also true, however, that when proper care is exercised in manipulation just as good steel can be made in the converter as in the furnace. It is impossible to distinguish our softest steels or to tell by any tests, physical or chemical, by which process they have been made. This is, I think, solely due to the care and skill exercised in regulating the temperature in casting. I must also confess that it is only lately that we have convinced ourselves of this truth and have attained such skill.

Prof. Akerman has ascribed the small tendency to red shortness observed in Swedish steel to the fluidity of the slag. In my opinion it is to the same cause that the basic Bessemer process owes its comparative immunity from the same trouble. In all successful basic blows the slag is at least as thin as molasses on a warm day. This undoubtedly helps to wash the metal free from oxides. To this reason must probably be ascribed the fact that but little if any more manganese is now needed to be added in the basic than in the acid process, in order to prevent red shortness. The natural inference from the use of the after blow would be that more manganese would have to be added in the basic process, since more iron is oxidized. This was indeed generally the case in the early days of the process, as is shown by the remarks of Thomas, Holley and others. Probably, also, the dilution of the oxides by the large amount of lime has its influence in the same direction.

The thin slag is also a factor in causing the low loss reported, since less metal will be retained in it in the form of shot. The basic process has the same advantage as to thin slag, but this is more than offset by its greater bulk, which is two and a half or three times greater than in the acid process.

The Caspersson ladle is no doubt a valuable and even a necessary adjunct to the Swedish works, where the charges are small, comparatively cold irons are used, and the rate of production is slow. Most of its advantages can, how-

ever, be obtained by allowing the metal to remain a few minutes in the vessel after the addition of ferromanganese, and by the use of shallow, dish-shaped ladles, such as those in use at Witkowitz and at Edgar Thomson.

The strainer may be a very good thing, but it strikes me that a man must be very sure of his temperature before he tries many experiments with it. I regret that Professor Akerman did not give dimensions of the two sizes of holes.

Copper Coating the Hulls of Vessels By Means of Electricity.

Those familiar with the subject, and therefore well qualified to express judgment, have frequently and emphatically

Theodore D. Wilson, late chief constructor of the United States Navy, in his report to the Secretary of the Navy writes as follows: "Thousands of dollars have been expended in the testing of protective and anti-fouling paints and compounds with results which give but very little encouragement to further experiments. We are forced to admit that despite the investigation of noted chemists and the deep study of other professional men there has not yet been discovered an efficient substitute for copper sheathing."

The method of sheathing steel vessels with wood and afterward applying copper to the wood is extremely clumsy. In order to prevent galvanic action taking place, to the injury of the steel, it is essential to first attach a 2-inch wood sheathing to the steel by

ble in sea water, and the resulting verdigris having scarcely any adhesion to its metallic base, falls off with the least possible force, like the wash of the waves or the movement of the vessel through the water, and in falling off carries with it the marine accretions, leaving the metal continuously bright and clean. So continuous is the corrosion of the copper and the falling off of the verdigris that the spores of the marine fauna and flora have no time to develop, and the copper continues clean indefinitely. Experience has shown, however, that the loss of copper from this cause is only 30 per cent. of its thickness in 15 years.

Another vital condition, dependent on the keeping of the hull clean by sending the vessel to dock, is the decrease in speed and consequent increase in coal consumption due directly to the greater power required to drive a hull covered with marine growth through the water. Chief Constructor Philip Hichborn, U. S. Navy, in his report of April, 1889, estimates the resistance of an iron skin as twice that of a smooth copper bottom, increasing to nearly threefold when moderately foul, and to nearly nine times when barnacled, and barnacles and seaweed may collect upon the iron bottom to such an extent as to reduce the speed of the vessel to an almost imperceptible motion.

It is well known that United States vessels in waters far from docking facilities lose sometimes as much as 50 per cent. of their speed efficiency because their hulls cannot be properly cleaned.

Chief Constructor Wilson of the Navy Department, in his argument for copper sheathing, submitted a letter from Commander Philip of the "Ranger," dated June 22, 1892, in which he called attention to the fact that with a clean bottom the ship readily made 7 to 8 knots on 7 tons of coal, while with a foul bottom she only made 6 knots though burning from 12 to 14 tons of coal per day.

We illustrate in a general way a method of copper coating the hulls of steel vessels by means of electricity after patents issued to Thomas S. Crane, and which are controlled by the Ship Copper Plating Company of Newark, N. J. By this method copper is deposited electrically upon the surface of the vessel in successive sections, the joints of the sections being overlapped to unite them. The joints are united so perfectly by the electroplating process that the whole coating of the vessel becomes an unbroken metallic sheet. The plating is done by means of a bath like a rectangular box open at one side and fitted water tight to the skin of the ship.

Fig. 1 shows in side elevation the application of the tanks to be applied to the hull of a vessel; Fig. 2 shows the bath for copper coating the keel, and Fig. 3 a method of forming a water tight joint between the tank and vessel.

In these drawings A is the hull of the vessel, B the baths applied to the side, and N N' the electric conductors, C in Fig. 3 being a tubing which forms the water tight joint between the edges of the bath and the side of the ship.

Any form of elastic packing can be used to make the bath water tight where it touches the iron hull of the vessel. The frames of the bath are made flexible, and may thus be bent to suit the curved lines of the ship at various points, and special baths are constructed to embrace the keel, as shown in Fig. 2, and for complex sur-

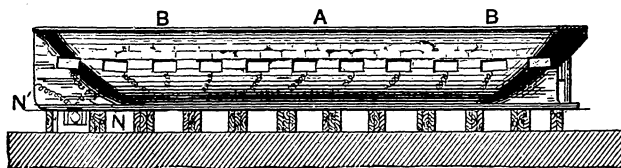


Fig. 1.—Side Elevation, Showing Tanks Applied to Hull.

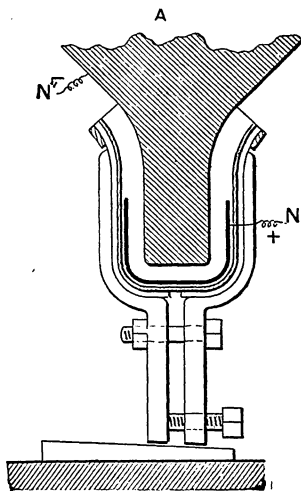


Fig. 2.—Bath for Copper Coating the Keel.

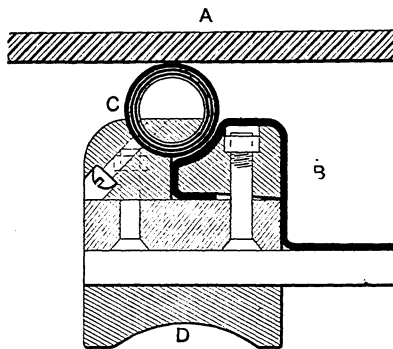


Fig. 3.—Section Showing Joint Between Edge of Tank and Hull.

COPPER COATING THE HULLS OF VESSELS BY MEANS OF ELECTRICITY.

called attention to the necessity for sheathing the hulls of steel vessels with copper in order to obviate the troubles arising from marine growth, both animal and vegetable, on vessels not sheathed with copper. It has been repeatedly pointed out that the cost of docking the vessels in the new navy will amount to many hundreds of thousands of dollars per annum, the cause for the docking being directly due to the fouling of the bottom. All the vessels should be docked twice a year and in some cases three and four times a year, depending upon the waters upon which they are afloat. Therefore any method which will obviate this difficulty should be received with favor. It is estimated by the officials of the Navy Department that the cost of docking, cleaning and painting the cruiser "Chicago" at suitable intervals during a three years' cruise will require the expenditure of nearly \$100,000.

means of iron bolts, and on this place a second 2-inch sheathing attached by means of copper bolts, and this finally covered with copper sheets.

It is well known that marine growths take place no matter what the hull of the vessel may be covered with. The advantage of using copper lies in the fact that the growth, instead of being so firmly attached as to require mechanical means for its removal, as in the case of painted and plain hulls, is so weakly adherent that a slight motion of the vessel through the water, or over the ebb and flow of the tide, serves to remove it. Therefore, while a copper coated vessel may under certain conditions of inaction become slightly coated, as soon as the vessel moves through the water this growth falls away. The present Chief of the Bureau of Construction and Repairs in the United States Navy explains this in the following language, referring to copper: "That metal being easily corroded

faces like the stern bearing and rudder post. It is very evident that the construction here shown may be modified considerably without departing from the principles underlying the system.

Somewhat extended experiments have shown that the copper can be deposited so as to perfectly cover the hull, and that it will cling with such tenacity to the steel as to make its removal impossible without destroying it. Concerning the rate and cost of depositing copper of suitable thickness by this method, it has been calculated that any number of baths 4 x 10 feet may be operated simultaneously in 70 hours' time with an expenditure of 6½ horse-power for each bath. Upon a vessel 400 feet long 60 baths can be operated at once in three rows on one side, with 390 horse-power; or 120 baths, 60 on each side, can be operated at once with 780 horse power, at a cost per day of \$150. It is stated that the whole bottom of a ship drawing 20 feet of water can be plated from the water line down complete in eight or nine days by using 60 baths at once on each side, with 780 horse-power, shifting the baths two or three times. The plated surface of such a vessel would aggregate 24,000 square feet and require 55,500 pounds of copper, which, at 12 cents a pound, would cost \$6660.

Banka and Billiton Tin Statistics

The Bureau of Statistics has published tables showing the quantities of tin produced in the Dutch East Indies. From the middle of April, 1891, to the middle of March, 1892, and during the years 1886 to 1891, the production of Banka was as follows:

Tin Production of Banka.

Districts.	Gross tons.
Muntok.....	260
Djeboes.....	700
Blinjoe.....	1,021
Soengeiliat.....	1,030
Merawang.....	696
Pairg Kalpinang.....	892
Soengeisleian.....	670
Koba.....	208
Tobaali.....	278
Total 1891-92.....	5,755
1890-91.....	6,490
1889-90.....	5,431
1888-89.....	3,993
1887-88.....	5,110
1886-87.....	4,668
1885-86.....	4,631

The figures for Billiton are as follows:

Districts.	Gross tons.
Tandjong Pandan.....	355
Manggar.....	2,518
Lingrang.....	1,905
Boeding.....	1,264
Dindang.....	342
Total year ending April 30, 1892.....	6,384
1891.....	5,842
1890.....	5,825
1889.....	4,795
1888.....	4,713
1887.....	5,400
1886.....	4,908
1885.....	3,759
1884.....	4,297

In the last year reported the number of hands employed in Banka was 7989, while the number was 8690 in the Billiton mines.

The statement in *The Iron Age* last week that serious distress had not yet become apparent in the Youngstown district is followed this week by news to the effect that the patience of storekeepers, harassed by wholesale merchants in need of funds, has become exhausted. Credit has been stopped and the large body of impecunious unemployed workmen are receiving public support for themselves and families.

World's Fair Awards.

Awards were announced last week by the chairman of the Awards Committee, John Boyd Thacher, in Group 77, Department of Machinery, and Group 114 in Manufactures. The machinery awards were for miscellaneous hand tools, machines and apparatus used in various arts and are as follows:

Illinois—Chicago—Tuerk Brothers, medal making machine, Tuerk's hot blast gas burner, time stamp; United States Mangle and Laundry Machine Company, combined mangle, shirt ironer and collar and cuff ironer; Western Steel Protected Glove Mfg. Company, machine for stapling gloves; McCanna Bros., steam cylinder lubricator or oil pump; F. A. Hardy & Co., automatic lens grinding machine; Crown Pen Company, exhibit of tools and machines in operation for making gold pens; P. J. Daemick and John Tobin, molding machine; Covell Mfg. Company, dish washing machine; George S. Blakeslee company, dish washing machine; Electro-Automatic Appliance Company, automatic engine stop; Exhaust Steam Purifying Company, steam separator; Garriss Cochrane Dish Washing Machine Company, Shelbyville, dish washing machine; Acme Machine Company, Moline, dish washing machine.

New York—New York City—Troy Laundry Machinery Company, mangles, washing machines, dampening, folding, drying, tumbling, starching and ironing machines, exhibition of model illustrating the construction of drying closets, &c., Duplex mangle machine, double geared brass washing machine; Clough & McConnell, wire corkscrew machine; American Road Machine Company, steel Champion road grader, Champion rock crusher, road roller; Ashcroft Mfg. Company, pressure and vacuum gauges, Bean's standard die stock and Brown's adjustable pipe tongs, Tabor indicator, continuous recorder; Nathan Mfg. Company, injectors, lubricators, oil cups and attachments; Schaffer & Budenberg, pressure gauges, ammonia gauges for ice and refrigerating machines, tachometers for high speed engines, and steam engine indicator, injectors and exhaust injectors; Sherwood Mfg. Company, Buffalo, injectors, oil cups, oil pumps, lubricators, flue scrapers, gauge cocks, grease cups and flue blowers; William S. Doig, Brooklyn, box nailing machines.

Pennsylvania—Philadelphia—R. D. Wood, standard apparatus for the manufacture and use of gas; Riehle Brothers Testing Machine Company, collection of testing machines; Riehle Brothers Testing Machine Company, measuring instruments; Tinius Olsen & Co., testing machines and micrometers; H. K. Mulford & Co., tablet, lcezege and camphor presses; Consolidated Mfg. Company, brush making machinery; Wm. Sellers & Co., hydraulic testing machine; Delahanty Dyeing Machine Company, machine for coloring raw stock; Harrisburg Foundry & Machine Works, Harrisburg, steam road rollers; Landis Bros., Waynesboro, cylindrical and cutter grinding machine.

Massachusetts—Boston—Crosby Steam Gauge & Valve Company, stationary, marine and locomotive pop safety valves, feed water regulator and revolution counter, steam engine indicator, single spring gauge, double spring gauge and water line syphon valve, pressure gauge tester; McKay Metallic Fastening Association, wire nail making machine;

Faneuil Watch Tool Company, bench lathes and attachments, watch makers' lathes and attachments, staking tools and the rivet patent friction clutch, watchmakers' lathes and attachments. Norton Emery Wheel Company, Worcester, emery wheels, tool room grinding machine, twist drill grinding machine. Northampton Emery Wheel Company, Leeds, emery wheels.

Ohio—Cincinnati—Lunkenheimer Company, fittings and appliances for steam engines and machinery, regrounding valves, gate valves, lubricators and steam whistles; J. H. McGowan, & Co., hydraulic tobacco machine. Springfield—Foos Mfg. Company, machinery for crushing, grinding and pulverizing, safety devices, attrition mill; Webster & Perks Tool Company, aluminum reducing wheel. Reliance Gauge Company, Cleveland, solderless copper floats and safety alarm water column; Hospital Supply Company, Sandusky, hospital laundry machinery; Brass & Iron Works Company, Fostoria, well drilling machinery; Bukey Iron & Brass Works, Dayton, tobacco cutter.

Connecticut—Bristol's Manufacturing Company, Waterbury, recording gauges for pressure, temperature and electricity; Pratt & Whitney Company, Hartford, Thurston torsion machine and Thurston oil tester; Springfield Emery Wheel Company, Bridgeport, stands, safety device for edge grinders, safe chuck for cup wheels, surface and large shear-blade grinding machine, emery wheel.

Michigan—Detroit—Detroit Lubricating Company, sight feed lubricators, low water alarm, oil cups, glass oil cups, valves and other brass work for engines and machinery; Penberthy Injector Company, injectors.

Missouri—Gus V. Brecht Butcher's Supply Company, St. Louis, general display of butchers' supplies.

Rhode Island—Samuel Moore, Providence, automatic machine for making metal beads.

Canada—G. A. Baron, Sherbrooke, clothes drying outfit and machinery for its manufacture; Lent & Coyne, Ridgetown, Ont., washing machine; James Morrison Brass Mfg. Company, Toronto, brass fittings.

Germany—Malmedie & Co., Dusseldorf, wire working machines, machines for making railroad spikes; imperial German Insurance Office, Berlin, appliances for the protection of workmen; Loeb & Co., Berlin, appliances for the protection of workmen.

Great Britain—Cress & Co., Limited, Devizes, Wiltshire, dish washing machines; Davies Bros. & Co., Limited, Wolverhampton, improved galvanized iron plates and the exposition of the method of manufacture; John Moncrieff, Perth, Scotland, water boiler gauge glasses; Sidney Smith & Sons, Nottingham, general exhibit of gauges, valves, fittings, &c.; Waterforce Laundry Machine Company, Limited, London, washing machines.

New South Wales—Robert Austin, Sydney, Austin perfect patent washer.

Russia—Prince Gagagene, St. Petersburg, electrical apparatus to the machine for testing the strength of materials.

Wrought Iron and Thin Metal.

The awards in Group 118, Manufactures, are for wrought iron and thin metal exhibit. They follow:

Illinois—Chicago—The Winslow Brothers Company, large hand forged carriage gate, hammered leaf wrought iron work, iron stairs, railings, newels, duplex electroplating on iron, metal mantels and attachments, elevator in-

closures; Northwestern Horse Nail Mfg. Company, horseshoes and nails; F. W. Hainsworth & Son, bedsteads; Architectural Iron Works, iron forgings, lamps, fire screens, candle, gas brackets, iron cross for graves.

New York—New York City—Tiffany Glass & Decorating Company, New York, wrought copper lamps, fire screen, wrought silver lamp; Bayor & Schebner, wrought iron art grille, and-irons.

Maryland—William Wedekind, Hagerstown, horseshoes and horseshoe tools.

Michigan—E. T. Barnum, Detroit, bank and office railings.

Massachusetts—Putnam Nail Company, Boston, horseshoe nails.

Indiana—The Central Iron & Steel Works, Brazil, open hexagonal turn buckles.

Connecticut—Caperwel Horse Nail Company, Hartford, horseshoe nails.

Pennsylvania—Cartwright Metal Roofing Company, Philadelphia, metal shingle roofing.

Ohio—William Russell, Centi, horseshoes; the Omniform Mfg. Company, New Brunswick, horseshoe and calk.

Italy—B. Zilaffi, Sienna, art metal; Taeddo Forcla, Bologna, art metal; Cav. E. Viarago, Milano, safety ladder fire escape (model); Costello Prospero, Florence, wrought iron.

Germany—Berlin—Edward Puls, two gratings of rare metal, large gate; Max Boettcher, wrought ornamental iron work; Max Marcus, wrought iron showcase; P. Marcus, wrought iron. Munich—Robert Smith & Co., candlesticks, hinges, tea stands; Gottfried Stumpf, palm tree of beaten iron, candlestick; Peter Koebbel & Son, wrought iron work, fancy; Joskunst, wrought iron door knockers, clock cases, &c.; Reinhold Rirs, lamp shades, lanterns, lattices, &c.; Joly Eisenwerk, Wittemberg, adjustable supports for lattices; L. Mannstaedt & Co., Kalk, lattice work for ornamental iron; Val. Hammerau, Frankfurt-on-the-Main, wrought iron ornaments for gateways, &c.; Fred. Keyser, Leipsic, flower baskets, tables, jewel caskets, &c.; Carl Koeshert, Dessau, fancy wrought iron work; F. K. Buhler, Offenbourg, wrought iron gate, embossed patterns in wire screen (wrought iron); Gebr. Armbruster, Frankfurt-on-the-Main, ornaments of wrought iron and ornamental metal work.

Canada—Sedingham Bros., Victoria, B. C., horseshoes.

Mexico—Gran Fundicion de Hierro de Monterey, Monterey, articles in iron.

Austria—Vienna—Alex. Nehr, artistic iron work done by hand; Auter Schwarz, artistic iron work; Ludwig Wilhelm, artistic iron work; Fred. Hubner, artistic forging; Edward Ferkely, Sig Pauditz Establishment, oxidizing wrought and cast iron.

Sweden—J. W. Oterly Company, Limited, Dannemora, milling machine, cutters and tools; Uddeholm Company, Limited, Uddeholm, steel springs and horseshoe nails; Degersfors Iron & Steel Works, Degersfors, hammers and stonemason's tools; Fagarsta Iron Works Company, Limited, Ustafors, springs and sundry tools; Finspong Gun Factory Company, Limited, Skon arbo, tools for working stone; E. J. Ljunberg, Falun, horseshoe nails; P. Peterson, Surahammar, bowls of pressed steel plates; A. G. Svedelius, Uddeholm Company, Limited, Soderfors, cold rolled steel springs.

Russia—St. Petersburg—P. P. Fon Derlos, horseshoes and nails; V. A. Kondakoff, models of horseshoes; L.

Renner, artistic wrought iron ornaments.

Spain—Santamaria, Barcelona, corrugated steel gates.

Germany—Moeller & Co., Hagen, rosettes and ornaments; Armbruster Bros., Frankfurt, artistic wrought iron work and gates; Franz Brechenmacher, Frankfurt, wrought iron, park gates, &c.; K. Buchler & Son, Offenbourg, modern wrought iron lattice.

Ceylon—Ceylon Government, Colombo, brass art ware, pewter plates.

Belgium—Société Anonyme des Usines et Fonderies de Zincs de la Vieille Montagne, Angleur, samples of roofing.

Denmark—M. Pederson, Brenderslec, brass and tin work.

New South Wales—J. L. McEachern, Albury, horseshoes, jumping, draft, coach, hunting, and racing shoes, set of farrier's tools; William Pitman Sydney, improved horseshoes; John L. McEachern, Albury, horse sling.

A few exhibitors in this group are not yet reported on and will be announced later, approved by the Executive Committee on Awards.

Iron and Steel and Their Products.

In Group 49, Department of Mines and Mining, embracing metallurgy of iron and steel, with the products, the awards follow:

Illinois—Chicago—Cambria Iron Works, four awards, collection of products, washed metal, Kelly steel converter and sections of iron and steel rails, steel axles; Crane Elevator Company, two steam reversing engines; Chicago Fireproof Covering Company, mineral wool, its manufacture and products; Sanderson Bros., tool steel; Illinois Fluor Spar & Lead Company, fluor spar and its processes.

Massachusetts—Washburn & Moen, Worcester, iron and steel bars, rods and wire.

New Jersey—S. J. Meeker, Newark, malleable iron, gray iron and brass castings.

New York—Chrome Steel Works, Brooklyn, collection of products of chrome steel.

Michigan—Elk Rapids Iron Company, Elk Rapids, charcoal pig iron.

Minnesota—Duluth Furnace Company, West Duluth, pig iron.

Missouri—Iron Mountain Company, Iron Mountain, photographs and charts of mills and mines.

Ohio—Otis Steel Company, Cleveland, steel boiler and fire box plate, cast steel rolls; State Board, four awards, Ohio iron shapes, pig iron, collective exhibit of iron ore, cold rolled steel; Youngstown Steel Company, Youngstown, pig iron and washed metal; Columbus & Hocking Valley Coal and Iron Company, Straitsville, pig iron; Briar Hill Iron & Coal Company, Youngstown, pig iron.

Pennsylvania—Pittsburgh—Singer, Nimick & Co., steel; W. Dewees Wood Company, iron and steel sheets and plates; Sterling Steel Company, steel armor projectiles; Crescent Steel Company, three awards, mining drill steel, fractures of steel, steel (die) compressed polished drill rods; Elwood Iron Tube Works, Philadelphia, metal tubing of steel; Alan Wood Company, Philadelphia, sheet iron and steel; Carpenter Steel Company, Reading, steel specimens; Chestnut Hill Iron Company, Columbia, iron furnace charge and products; Pennsylvania Steel Company, Steelton, bridge materials; Bethlehem Iron Company, South Bethlehem, nickel steel; Tyler Tube Company, Washington, charcoal iron tubes; Pottstown Iron Company, Pottstown.

California—Clipper Gap Furnace, Placer County, pig iron.

Ohio—Solid Steel Company, Alliance, collection of castings of open hearth steel.

Germany—Essen—F. Krupp, ten awards, bed plate of molded steel casting, collection of steel casting, collection of steel tires, pressed steel centrifugal vessels, steel cast center for locomotive driving wheel, collection of forging of open hearth steel, steel cast stem for armored vessels, steel cast locomotive frame, collection of products of iron and steel including compound armor plates; Kgl. Friedrich Smelting Works, Tarnowitz, products and ores of zinc; D. C. Olls & Co., Dahlhausen, drawings of a coke oven; G. Luttur, Magdeburg, drawings showing blasting operation at the Ersomic Thee Danube, &c.; Rud. Boecking & Co., Neunkirchen, cast iron pipe, rolled and forged iron bars, wires; Kgl. Friedrichsgrube, Tarnowitz, 26 pieces lead and zinc ores; Hoerde Mining & Steel Company, Hoerde, Westphalia, wheels, axles and iron superstructure for railway; George Mary Mining, Iron & Steel Company, Osnabruck, rail joints and sleepers, &c.; Union Actiengesellschaft fuer Bergbau Eisen und Stahl Industrie, Dortmund, pressed castings, axles and wheels for locomotives; Union Stock Company for mining iron and steel, Dortmund, products of steel; W. Fitzer, Laura-huette, collection of hand welded objects in wrought iron; Bochumer Verein, Bochum, chime of barge steel cast bells; Hoerde Mining & Steel Company, Hoerde, Westphalia, sections and specimens of materials; Association for Sale of Spiegeleisen, Siegen, spiegeleisen; Deutsch Oesterreichische Mannesmann Works, Berlin, seamless Mannesmann pipes for oil wells; Fried. Krupp Grusonwerk, Magdeburg Buckau, chilled iron; Gute Hoffnungshuette Oberhausen, iron work for exhibition hall of Fr. Krupp; Johann Wolff, Fuchs, Nuremberg, fine wires of steel, &c.; Stumm Bros. & Rud. Boecking Company, Neunkirchen, articles made of steel rails; Stumm Bros. & Rud. Boecking Company, Neunkirchen, collection of cast iron pipe; Masch Anstalt, Kalk, rolled steel; Phoenix Actiengesellschaft Bergbau & Huettenbetrieb, Liar near Rubrort, section of grooved rails; Vander Zypen & Charles, Cologne, Deutz, solid, pressed parts of steel for passenger and freight cars.

Great Britain—Low Moor Iron Company, Bradford, sea lime, coal and ironstone and refined metal, puddle and finished iron; Jessop & Son, Sheffield, crucible cast steel in bars, sheets and forgings.

Italy—Sagsamoto Vanzette & Co. Milan, steel castings.

Mexico—Ricardo Honey Limapan, Hidalgo, iron rods worked in a cold state.

Russia—Princess Abancleck, Lazarewo, collection of iron bars and sheets; Votkinsci Iron Works, Votkinsci, three awards, cold and hot test of Martin steel, collection of models and drawings, collection of pig iron and steel; Mountain Blagodat Mine, Peru Blagodat, magnet iron ore and associated rock; Balashoff Bros., Ufa, specimens of pig iron; Huta Bankowa Iron Works, Dombrowa, 24 specimens of steel bars; iron works of Mr. Rastorgwebt, St. Petersburg, 331 specimens of molding of cast iron; Katharine Iron Works, Petrokoff, one roll for mills; Zagazinsky Iron Works of Mr. Shemoff, Ufa, three rings of cast iron; Chubintz, Kivirli Caucasus, four specimens of manganese ore, pyrolusite; Mining

Administration of South Russia, manganese ore

Siam—Government of Siam, Bangkok, iron, sulphur and copper ores, &c.

Spain—Altos Hornos, Bilbao, iron and steel ingots.

Sweden—Osterby Iron & Steel Works, Dannermora, collection of charcoal and bar iron; Sandviken Iron Works, Sandviken, bands of steel; Jernkontoret, Stockholm (five awards), collection of charcoal, pig and cast iron, collection of iron ore, collection of Lancashire iron, Bessemer open hearth steel, collection of steel castings, collection of iron and steel in bars, rods, &c.; Uddeholm Company, Uddeholm, collection of iron ores and products of iron and steel.

Venezuela—Government of Venezuela, Caracas, iron ores.

Austria—Crucible Steel Factory, Kladno, steel in all forms; Manufacturing of Iron and Steel, St. Egyd, files and scythes; Gartenberg, Lauterbach, Goldhammer & Wagmann, Drohobyer, different kinds of ceresine and osokerite; Establishment for Rolled Tin Plate Rudolfshuette, Teplitz, thin sheet iron.

Brazil—Fabric de Ferro de Zpanoma, St. Paula, bar iron and other products.

Canada—Canada Iron Company, Montreal, ores.

Antimony and Other Metals.

There were a few awards in Group 54, Mineral Department, metallurgy of antimony and other metals not specially classed. The medal winners were:

California—Mathison Smelting Company, San Francisco, Star antimony.

FOREIGN COUNTRIES.

Great Britain—Johnson, Marthey & Co., London, platinum and platinum apparatus and metals.

Japan—Kumasuke Kawabata, Zeuts, stibinites dressed ore; Kudo Yoshimichi Wada Ehime, refined antimony; Fijitagumi, Osaka, pure antimony.

For Tin and Tin Plate.

Awards in Group 52 are for metallurgy of tin, tin plates, &c. They follow:

Ohio—Cincinnati Corrugating Company, Piqua, Americanterne plate.

South Dakota—Hill City—Harney Peak Company, tin ore treated by concentration and smelting; Mining District of Hill City, tin ore prison rock; Keith & Co., Deadwood, calcium carbonate of lime; Harney Peak Mining Company, concentrates cassiterite, black tin; Bear Gulch, tin ore cassiterite.

FOREIGN COUNTRIES.

Japan—Kihachiro Kawamoto, Kyoto, tin foils and papers.

Early Apparatus in Mining.

In Group 68, Mines Department, which includes originals or reproductions of early and notable apparatus used in mining, the following awards were made:

California—California State Mining Bureau, rocker with sieves and pan for washing and testing gold.

Massachusetts—City of Lynn, Mass., first iron casting made in America.

New York—George F. Kunz, Tiffany & Co., New York, historical implements, instruments, medals and relics.

United States Government—Department Mines and Mining, department exhibit of transparencies.

Graphites, Clays, and Asbestos.

Group 46, Department of Mines and Mining, includes graphite and its

products, clays and other fictile materials and their direct products, asbestos, &c. The awards were in part as follows:

Colorado—Golden—Golden Pressed Fire Brick Company, collective exhibit of clays and bricks; C. P. Hoyt, clays, Kaolin.

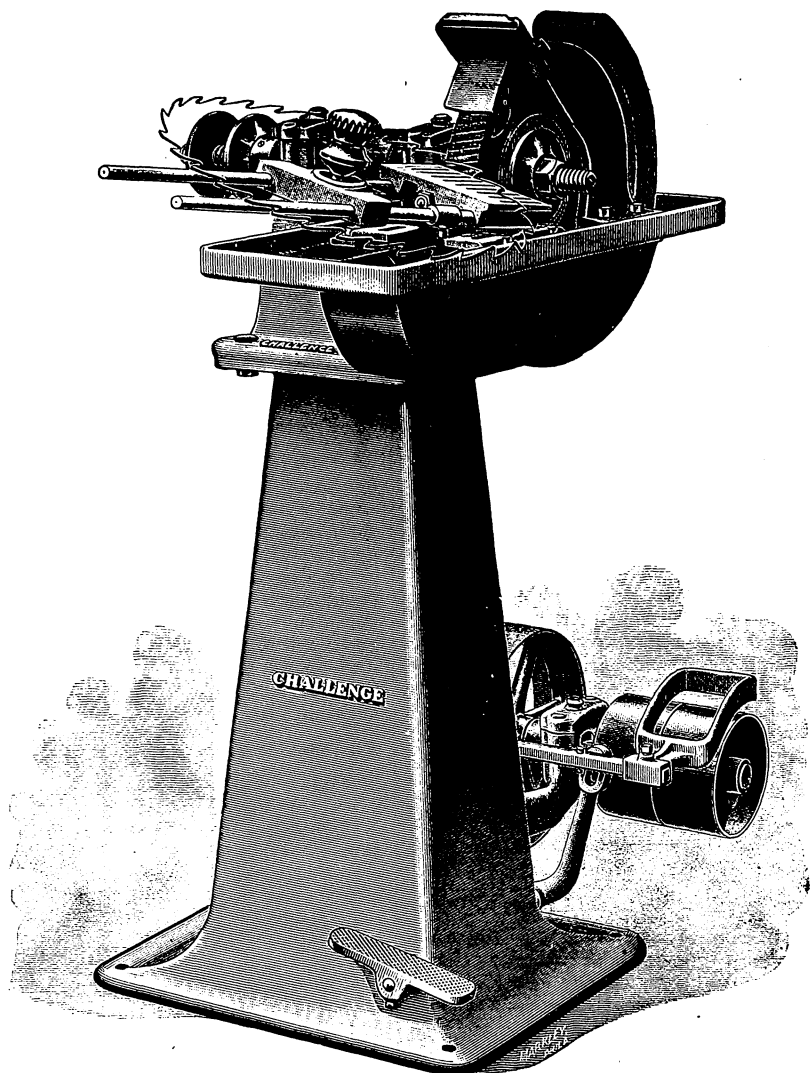
Georgia—Chicago—Salt Mountain Asbestos Company, short fiber asbestos in rock and ground.

Illinois—Chicago—H. W. Johns Mfg. Company, asbestos manufacturing machines and products.

Indiana—Indianapolis—United States Encaustic Tile Works, encaustic tile.

The Challenge Emery Grinder.

We here illustrate a new emery grinder, with saw sharpening attachment, which is so arranged that one of the wheels may be run dry and; the other with water. The device incasing the wheel on the right is for wet grinding, water being used to prevent drawing the temper of the saws when being ground; a similar device, not shown in the cut, is also provided when wanted for dry grinding. These wheel guards are so arranged as to catch and retain all the dust and grindings without requiring the employment of ex-



THE CHALLENGE EMERY GRINDER.

Massachusetts—Taunton—Phoenix Mfg. Company, graphite crucibles.

Missouri—St. Louis Hydraulic Brick Company, brick and fire clay.

New York—Glasgow—F. M. Van Dusen and 16 others, Glasgow, tempering of sand, &c. **Ticonderoga**—Dixon Crucible Company, graphite, crude, in lumps. **New York City**—H. W. Johns Mfg. Company, technical display of asbestos.

Pennsylvania—Philadelphia—Cyrus Borgner, fire brick and clay retorts; **Georgia** Beauxite Mineral Company, beauxite mineral ore; Robert Taylor & Son, graphite crucibles, retorts, dipping cups; **Star Encaustic Tile Company**, floor and hearth tiles, plain and encaustic; **Beaver Falls Art Tile Company**, Beaver Falls, embossed and enameled tile.

haust fans, and they also serve as a protection to the workman in case of accident to the wheel. The guard for wet grinding differs from that for dry grinding in having an opening at the back through which the curved piece shown is introduced to control the height of the water in the tank below, the amount of water thrown upon the work depending upon its height, or the depth to which the wheel enters it. The piece mentioned is held in place by a spring, and can be instantly adjusted to any desired level. By the form of hood adopted the water picked up by the wheel is thrown directly on to the work, and the hood can, by the arrangement shown, be readily adjusted to suit the wheel as the latter wears down. The guard for dry grinding will also hold water below, which serves

to catch and retain all dust and grindings. Both arrangements are provided with separate pockets in front, this separate pocket being for water in which to dip tools.

The machines are built in seven sizes, suitable for wheels from 10 to 30 inches diameter, the smaller sizes being arranged to place on the bench, belting from above or below, or they are mounted upon a plain base or upon the one shown, which has countershaft attached. In this latter arrangement the driving side of the belt passes through a hole provided for that purpose at the top of the column and down through the hollow column to the driving pulley.

The attachment for sharpening saws is so arranged that circular saws of any shape or pitch for rip or cross cut can be put in perfect round, gummed and ground straight or bevel to any desired degree, the teeth being exactly alike. It will be noted that the face of the wheel shows transverse corrugations, the purpose of which is to prevent glazing and heating and to increase the cutting. This is done by a double dresser furnished with the machine, one end of which forms corrugations, while the other end dresses to a smooth surface for fine grinding. This machine is made by the Appleton Mfg. Company of Thirtieth and Thompson streets, Philadelphia.

WORLD'S FAIR NOTES.

J. G. Hoffman

of Chicago, inventor of the Tornado fan blower, exhibits one at Column L 33, Machinery Hall. A forge of his design, supplied with a trough, is also shown. The Tornado fan blower has a combined crank and lever motion and gives an after blast the same as a bellows. There is no dead center and it can therefore be operated from any point with either a long or short stroke. All parts are interchangeable, and the fan shaft runs on hardened centers with self oiling supplies. These goods are manufactured by the Hurlbut Mfg. Company of Racine, Wis.

The Walworth Mfg. Company

of Boston, Mass., have a large and comprehensive exhibit at Column O 27, Machinery Hall, of the many articles for which they have long been known as manufacturers. In a handsome case of ebony finish, supported by Ionic pillars, displayed against a black background, a beautifully finished assortment of nickel-plated steam and water fittings stands out in strong relief. Two sections of the Mills boiler, which they now manufacture, and the Walworth automatic sprinkler, are conspicuously shown. Cast iron fittings, valves and an extensive variety of expansion joints are displayed. The Ashley and Stillson wrenches, so well known as the product of this company, are tastefully arranged, while an attractive feature is the Hall tapping machine, which is used for tapping street mains of from 4 to 24 inches in diameter while under pressure. A brass railing surrounds the entire exhibit, while on each corner a support for street railway service, either for trolley wires or elevated system, blocks off their large space.

Allington & Curtis Mfg. Company

of East Saginaw, Mich., have one of their dust collectors in full operation at Column E 53, Machinery Hall, in connection with a Sturtevant fan. The

efficiency of their collector is made apparent to every one who visits the exhibit.

The U. S. Wind Mill & Pump Company

of Batavia, Ill., have constructed a building in the wind mill section on the exposition grounds, which is in the shape of a wind mill base. It gradually tapers toward the top, where a 30-foot Halladay wheel revolves and transmits power to a number of machines of their manufacture, shown in the 40-foot circular room below. Among these are noticeable an I-X-L feed mill and sheller, saw frame, horse-powers, haying tools and pumps. Models of their several wheels are also shown.

E. B. Steele

of Chicago, manufacturer of adjustable window derricks for the hoisting of organs, pianos, safes, &c., has an exhibit in Machinery Hall, at Column M 30. The fastenings of this derrick are positive and rigid. Those shown at the fair have stood a test of 8700 pounds and will safely carry 6500 pounds. They are easily erected and may be quickly taken down for transportation, consisting merely of a frame work to fit in an ordinary window frame, to which it is easily clamped. Attached to the frame work is a projecting piece in inverted V shape, the sheave being fastened in the apex.

The Goodsell Packing Company

of Chicago have an interesting exhibit at Column I 32, Machinery Hall, of their engine packing, showing raw flax and coil after coil of their combination of braided flax, woven duck and rubber cushion for piston rods, pump plungers, &c. Showcases contain the Rubber Back Flax and the Swain Metallic Packing made by them. This packing is in wide use for steam, water, air, ammonia, &c.

The National Machinery Company

of Tiffin, Ohio, exhibit a large line of machinery at Column K 46, Machinery Hall, most of which is shown in operation. The company are extensive builders of bolt and nut machinery; also upsetting, bending, spike, rivet and wire nail machines, &c. The display of bolt and nut machines is an excellent one, the specimens shown demonstrating the perfection achieved in this line of automatic machinery. The bolt cutters comprise a 1½-inch single, 1-inch double, a 1½-inch double, a 2½-inch double, and a double rapid track. For the purpose of giving a correct idea of the dies used in these cutters a head has been separately mounted, which is fitted with four different kinds of dies—flush case, plain, case and hat. The plain die is made of a piece of steel cut off at an angle of 50°. The hat die is made in the same way, but has a milled steel hat or plate fitted close with one screw on top, to prevent it moving endwise. The case die is made of malleable iron; cores are cast and then broached to exact size, grooved on both sides to lift easily in the die ring; has all the back bearing; is grooved in front to throw the chips, and has a sharp edge to remove any grit that may get in the slots of the barrel. The flush die is made by dividing the face plate on the head in four parts and shouldering the case and holding the chaser by means of a shouldered screw. The mechanism for opening and closing the head of these bolt cutters is an important improvement, permitting this to be done either automatically or by hand.

Another improvement is a centering device for the jaws. The double rapid track bolt cutter is adapted to the continuous threading of bolts for one or two days without changing dies, as practiced in bolt works. With two spindles 5000 track bolts can be threaded per day, while a three-spindle machine will thread 7000, at a speed of 250 revolutions per minute. The nut tappers shown are of two kinds. One is a six-spindle back geared machine, with the spindles arranged in a straight frame. The power is applied between the bearings on the driven spindles, any one of which can be stopped independently of the others by a treadle immediately underneath. There are six changes of speed. The other style of tapper shown is a rotary. It occupies a conspicuous position in the front of the exhibit, and its unique appearance always attracts a crowd of spectators. This machine has ten spindles arranged in a circle, traveling round a central column. These spindles are driven from a central spur wheel, fixed at the center, and all the spindles having pinions engaging with it. Below the spindles a large pan revolves simultaneously with them containing the holders for the nut blanks. The operator stands in front of a place on the central spur wheel where a worm thread has been fixed which engages with rack teeth on each spindle as it comes round. The spindle thus rises from the completed nut, which is then removed by the operator and a fresh blank is inserted for tapping. It performs its work well and with remarkable rapidity. A bolt heading, forging and upsetting machine is shown, which is one of the most powerful of its class, especially adapted for use in large railroad, forge, bridge and car shops. It has a suspended rocking die attached to a hinge toggle motion and operated by an eccentric face cam on a side shaft. One of these was recently sold to the Eames Vacuum Brake Company of Watertown, N. Y., who have since sent some 800 pounds of forgings to be shown in connection with the National Machinery Company's exhibit. These forgings embrace a number of heavy pieces of rather difficult pattern. Other machines exhibited are a No. 3 bolt heading and upsetting machine, an improved Burdick bolt header, a hot pressed nut machine and a wire nail machine, besides a model of the National rock and ore breaker. A full sized breaker is exhibited in Section X S, Post 9, Transportation Building. Since the exposition opened the company have sold 60 of their wire nail machines to the I. L. Ellwood Mfg. Company of De Kalb, Ill., and ten to the Carnegie Steel Company for their Beaver Falls works. Numerous sales of other machines have also been made through this exhibit to domestic and foreign firms, whose names are conspicuously displayed in connection with prints of the machines on a bulletin board. J. W. Duntley, 1020 Monadnock Block, Chicago, is general sales agent for the company.

The Wm. P. Miller Company

of 100 Greenpoint avenue, Brooklyn, and 212 Washington street, Chicago, make a good display of their lubricating material at Column L 33, Machinery Hall. The columns of their booth are formed of boxes of American and Universal lubricant, Shield cylinder grease and Victory compound, and cans of lubricating compound and Shield cylinder grease, the boxes forming the bases and caps of the columns and the cans forming the center. The roof has a cornice

of shafting cups. A pyramid is erected in the center of the booth for the display of more shafting cups, while piles of cans of lubricating material are grouped about the space. In connection with this exhibit, a sample is shown of the Wiley safety oil cabinet by R. R. Street & Co., 184 and 186 Washington street, Chicago. This is a receptacle for oil, intended for use in stores and factories, having a sink with a hinged lid at the top where oil is drawn and measured, the drippings going back into the cabinet, a hydraulic seal preventing evaporation. It has a wood case and a zinc lining to keep the oil cool in warm weather and prevent the generation of gas. The oil is pumped or syphoned into the cabinet from the original barrel.

Curtis & Curtis

of Bridgeport, Conn., exhibit samples of their specialties in pipe working tools at Column J 38, Machinery Hall. Among these are several power cutting and threading machines, the largest being shown belted up and in practical operation on 8-inch pipe. Half a dozen other sizes of such machines for either hand or power are exhibited, but not in operation. Two of them are mounted on bases with countershaft and driving pulleys attached, but the others consist merely of the cutting head, shown as a portable hand machine. All have samples of threaded pipe attached to show the exact work done on each size of machine. The Forbes die stock used in these machines is a complete tool, being all that is required to thread or cut off pipe, while much lighter than the old style of stock and the vise which must accompany it. With it one man can cut off and thread large pipe up to 8 inches diameter by hand and without assistance, while with the smaller sizes a boy can thread 2 and 3 inch pipe with but one hand on the crank. The bits draw back out of the way when the thread is cut. The parts are shown of an ingenious pipe and bolt threading attachment for lathes. This attachment has been devised to meet the wants of those whose work does not warrant the purchase of a regular power pipe threading machine. It can be fixed to any lathe within certain limits of size. It consists of a die carrying head attached to the spindle like a chuck, an adjustable self-centering vise attached to the carriage, and an adjustable pipe rest attached to the bed of the lathe to support long lengths of pipe. The feeding is done by hand, or an automatic feed can be arranged by setting the lead screw of the lathe to the number of threads corresponding to the standard of thread to be cut. Samples are shown of pipe vises, both hinged and solid frame, also reversible ratchet drills and reversible ratchet die stocks.

The Duke Engine Mfg. Company

of Grand Haven, Mich., exhibit at Column I 37, Machinery Hall, the most singular engine in the exposition, which is known as the Duke square piston double reciprocating engine. The cylinder of this engine is square and only from $2\frac{1}{4}$ to 5 inches thick for power ranging from 1 to 20 horse. The piston being reciprocating, and taking steam at four different points, all danger of a dead center is avoided, and the engine starts off promptly on the admission of steam. The company make a specialty of small engines of 1 to 20 horse-power for all purposes. They are specially adapted, however, for direct attachments, as, for instance, to fans, blowers, centrifugal pumps, dynamos,

&c. Those in operation in this exhibit are driving fans and blowers, running very smoothly and noiselessly at high speed. For the purpose of showing the interior construction, the head has been removed from the cylinder of one engine and replaced by glass, the piston being run by a belt from another engine. Machines of this type have now been in use constantly for two years without perceptible wear. Marine engines are shown, which have been devised for various uses on shipboard, such as hoisting freight, reeling hawsers, &c. The same engines are adapted to use as builders' and contractors' hoists. There are also square piston double reciprocating engines with a reversing lever attached, which simply admits steam from opposite directions according to the position of the lever, and without complicating the engine in the least. Yacht and launch engines are thus easily arranged and take very little space. The company make a steam feed engine of the same type for saw-mill use. These engines have attracted much attention, especially from foreign visitors.

J. E. Lonergan & Co.

of Philadelphia make a fine exhibit of pop safety valves and oil cups at Column M 27, Machinery Hall. These are shown on a set of pyramidal shelves in the center of the space and in show-cases on either side. Safety valves are arranged about the lower part of the pyramid and oil cups on the upper shelves. The showcases contain elegantly finished oil cups. The safety valves are well designed and so constructed as to give prompt and reliable action in service, holding the steam remarkably close to working pressure and not allowing it to rise above the point set, if the valve is of the proper size. Water relief valves are shown, which are designed for use on steam pumps, fire hydrants, steam fire engines, feed water heaters, &c., wherever an automatic valve is needed to relieve over-pressure of water and prevent hose or pipe from bursting. These are also used on steam engines to prevent damage caused by water in cylinders. Lock-up valves are also shown for portable farm, fire and hoisting engine boilers. In connection with the foregoing devices an exhibit is made of steam specialties manufactured by Timothy Kiely of New York. These comprise a positive acting pump governor for automatically returning condensation to boilers when a low pressure is carried or the exhaust is used for heating purposes; a Standard steam trap, containing an open float that cannot collapse, and, being hinged to the cover, has three or four times the power of open floats ordinarily used in drain traps; high pressure reducing valves constructed to carry up to 200 pounds on the high pressure side and to reduce to anywhere from 15 to 180 pounds without the slightest variation, pressure regulators, back pressure valves, multitubular oil and steam separators, return traps, &c. This entire display is under the charge of the Chicago Engineer Supply Company, 108 Lake street, Chicago, Western agents for the sale of the goods. They have issued a handsome catalogue, covering these and other steam appliances.

Frequent recent attempts at train wrecking have obliged the Canadian Pacific Railway to patrol its tracks near Quebec with armed men.

Fuel Oil System at the Fair

As is pretty generally known, no coal or other solid fuel is used for steam purposes at the exposition. The large quantity required—about 550 tons per day of twenty-four hours—for firing the immense steam plant would have rendered the problem of providing, storing and preliminary handling a very serious one, to say nothing of the army of firemen and laborers required. The mere matter of collecting and disposing of the 75 or 100 tons of ashes would have involved a considerable amount of trouble and expense, and it would have been impossible to avoid the very objectionable necessity for running railroad trains into the grounds continuously, which, with the attendant switching, would have been highly dangerous to life and limb. In view of these facts, and also that it may be considered as being more in the line of progress, the use of oil fuel was very early decided on, the intention being that the composite system employed should place on exhibition the latest and most improved forms of oil-burning apparatus and appliances relating thereto, as well as the receiving, storage and distribution systems. The exceptional nature of the conditions to be met rendered it necessary to exercise the utmost care in making the plans. Any mistake or oversight which, in case of an ordinary plant would be of little or no importance, might lead to very serious results in this instance.

On the score of magnitude the plant may be considered as unprecedentedly large—not, possibly, as to the steaming capacity, but as an all oil-fired boiler plant. It is, necessarily, somewhat complicated, as, in addition to the boilers in the main battery, there are several isolated steam plants of considerable size throughout the grounds which are operated by this system. In order to obviate the necessity for delivery by tank cars a 6 inch pipe line was laid, connecting the system directly with the Standard Oil Company's refining works at Whiting, Ind., thereby insuring an unfailing supply at all times. The fuel is not crude petroleum, as stated, but "residuum"—a by-product from the refining of illuminating oils—the actual fire test of which is 350° F. As this is very considerably above any probable temperature to which either the main volume of oil in the storage tanks or that in the pipes forming the distribution system can be exposed, it may be considered as absolutely safe from accidental explosion or ignition; as a matter of fact, however, as will be clearly apparent from the accompanying illustrated description, the system now in operation is so perfect in all essential details, and so well provided with safety and precautionary devices, that even were the alleged "crude oil" used, it might be done with perfect safety, notwithstanding the explosive nature of the liquid fuel, due to its large percentage of free hydrogen.

In order as much as possible to isolate the receiving and storage tanks, oil pump house, &c., they were located at the most remote point within the grounds, namely, in the narrow angle formed by the boundary fence and Lake Michigan, at the extreme southeast corner. It is here so far removed from the nearest buildings that even if the entire body of oil stored were ignited, the danger of a general conflagration would be very slight. From the pump house the oil is conveyed to boiler house by a 5 and 6-inch wrought iron pipe laid under-

ground at a sufficient depth to protect it from all external influences. These pipes are paralleled by 2-inch live

syphon or U is placed, while directly following is a pavilion or valve station, from which the entire distribu-

the valve house, can within a few seconds not only stop the flow of oil from the pumps, but actually reverse the ac-

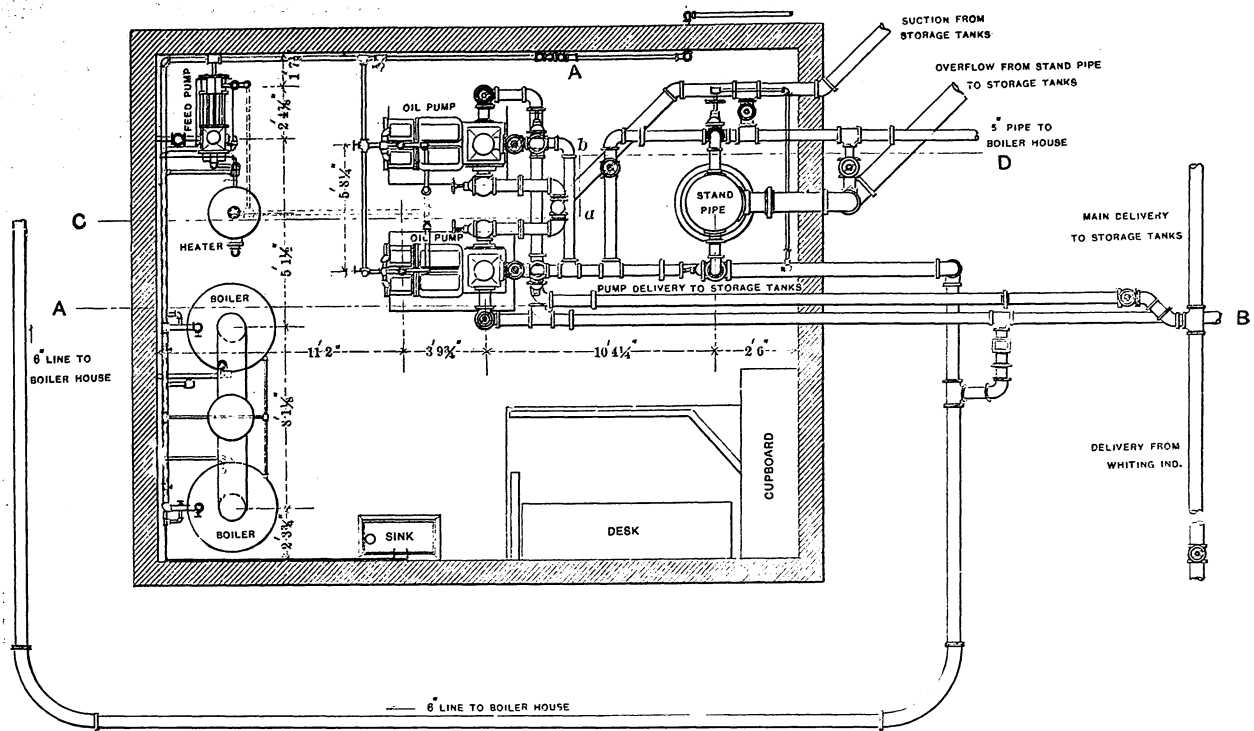


Fig. 1.—Plan Oil Pump House.

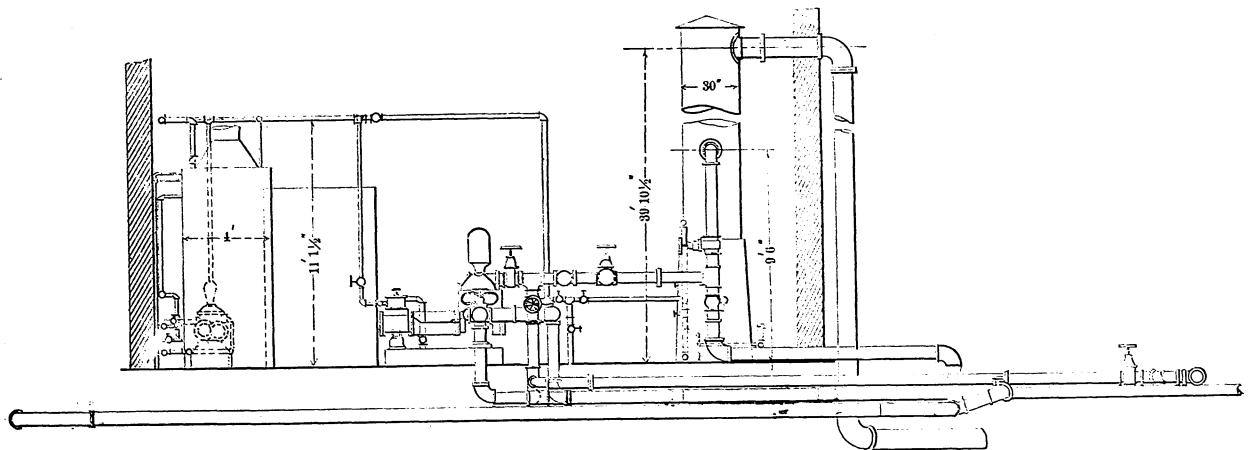


Fig. 2.—Section A B Oil Pump House.

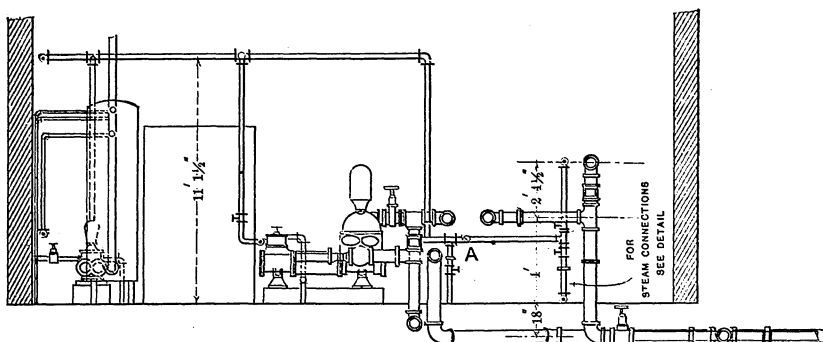


Fig. 3.—Section C D Oil Pump House.

FUEL OIL SYSTEM AT THE FAIR.

steam pipes their entire length to insure fluidity at all times. Within 300 feet of the boiler house an inverted

tion system is controlled. In case of fire or danger of any kind, the attendant, who is stationed night and day in

tion of the latter and cause them to draw from and quickly empty the entire line of distributing pipes and return the contents to the main storage tanks from which it was drawn.

Within the fire room, and running the entire length of the battery of boilers, the main supply pipe is laid in a trench close to the foundation of the boiler fronts, and covered by close-fitting cast-iron floor plates. This pipe is wrought iron, 5 inches diameter. From it to each burner is a $\frac{3}{4}$ -inch vertical pipe, provided with a globe valve, and above the latter a union for connecting the burner. This valve is used exclusively as a shut-off, and is entirely independent of the regulation, which is effected by means of adjusting valves belonging to the burner itself, and used for no other purpose. The burners may therefore at any time be disconnected and removed for cleaning or inspection, regardless of the flow of oil in the main pipe. The burners used are exhibits,

and comprise many different makes, as shown by the following list of boilers and their equipments :

Make of Boiler.	Make of Burners.	Number of Burners.
Abendroth & Root.	Reid.	16
Gill.	Armstrong.	12
Heine.	Greaves.	12
Heine.	Burton.	8
Heine.	Reid.	12
Heine.	Wright.	8

particularly advantageous to the use of oil fuel. With the exception of those using the Reid burners, however, the furnaces are of the ordinary standard construction ; while in case of the latter they are modified—or, more correctly, supplemented—by the use of a vertically curved bridge wall, like a side arch, having its concave side toward the burners, which are so placed

portion of the boiler being subjected to the severe temperature of initial combustion. Also, by reason of the very high temperature of the hearth and arch, a large quantity of radiant heat is thrown off to the evaporating surfaces of the boiler.
Referring now to the several drawings, the entire system may be followed, from the main receiving pipes to the

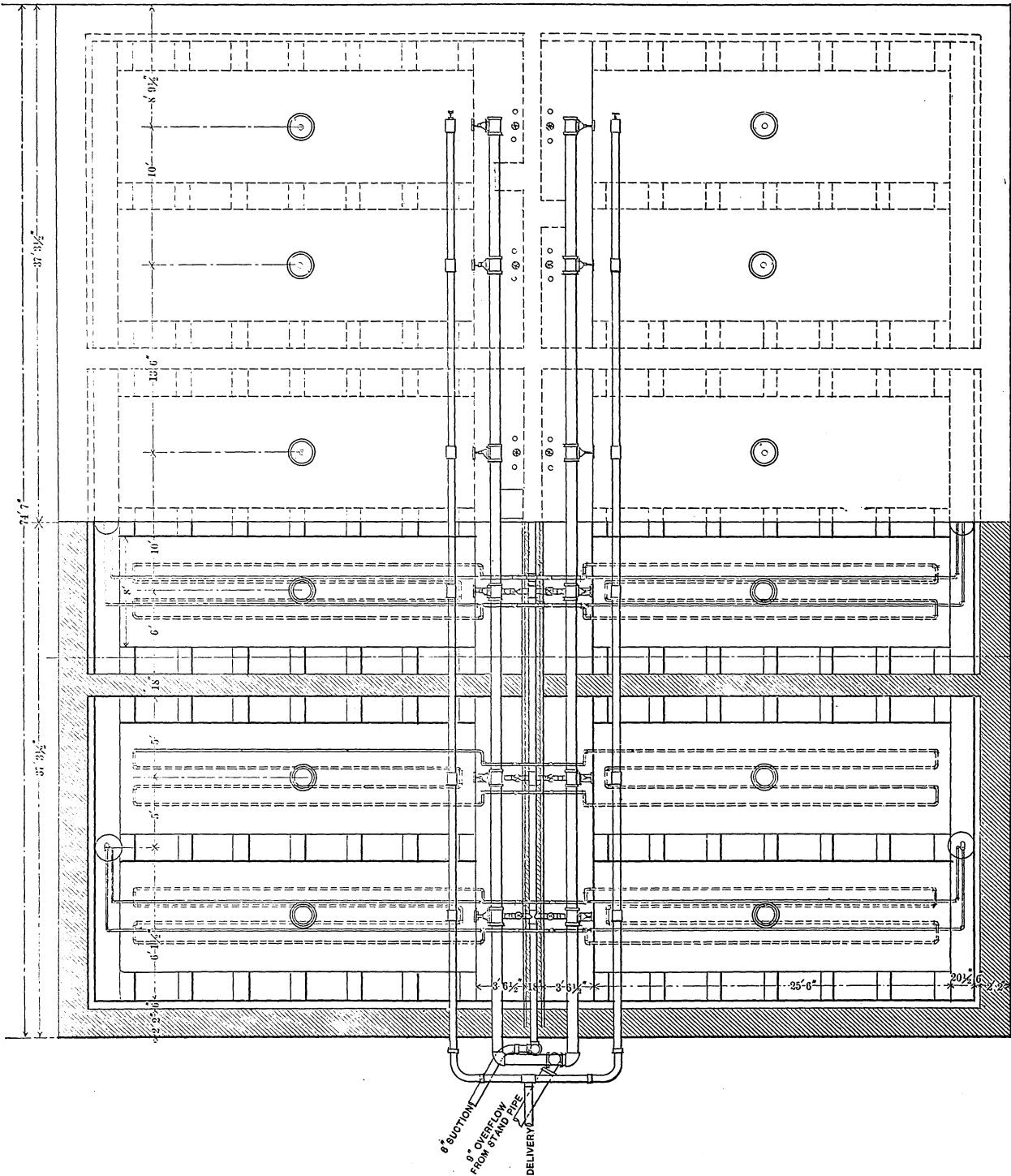


Fig. 4.—Plan Oil Storage Vaults and Tanks.

FUEL OIL SYSTEM AT THE FAIR.

National.	Reid.	16
Zell.	Reid.	46
Babcock & Wilcox.	Larkin.	30
Sterling.	Burton.	8
Sterling.	Locomotive.	8
Heine (west fire room).	Greaves.	12
Heine.	Burton.	8
Climax.	Larkin.	20

As all of the above boilers are of the water-tube type, their settings afford large combustion chambers, which are

as to throw the mass of flame at a slight angle toward the hearth. As it impinges at a tangent at all points of hearth and bridge wall with which it comes in contact, the flame is thrown forward and upward without undue frictional resistance, and is thus brought within the influence of the chimney draft at a greatly reduced velocity, and a most perfect diffusion effected without any

burners, and it will be readily seen how little foundation there is in fact for the sensational statements made concerning danger from fire from this plant. Figs. 1, 2 and 3 are, respectively, plan and sectional elevations of the oil pump house, showing the arrangement of pumps, stand pipe and suction and discharge pipes, &c. It will be seen that the pumps are in duplicate,

each having its independent pipe connections, which are similar in all respects and capable of the same manipulations in handling the oil. Each pair is of ample capacity for furnishing the required supply at a low rate of piston

6-inch delivery from Whiting connects directly with the storage tanks. A second 6-inch pipe, at right angles with the first, connects with the main suction pipe of the pumps. This is for pumping the oil from tank cars on the

This duty may be performed by either pair of pumps, while the other is delivering the oil to the distribution system, and, therefore, there is no danger of interruption of the supply, whatever be the source of delivery.

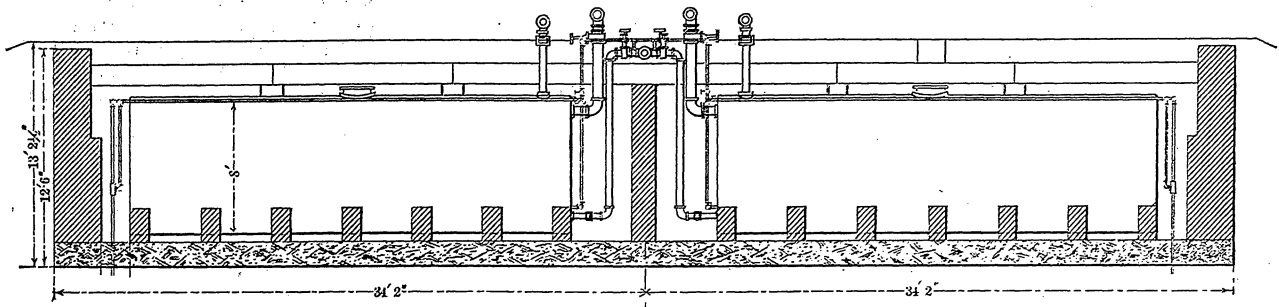


Fig. 5.—Section Oil Storage Vaults and Tanks.

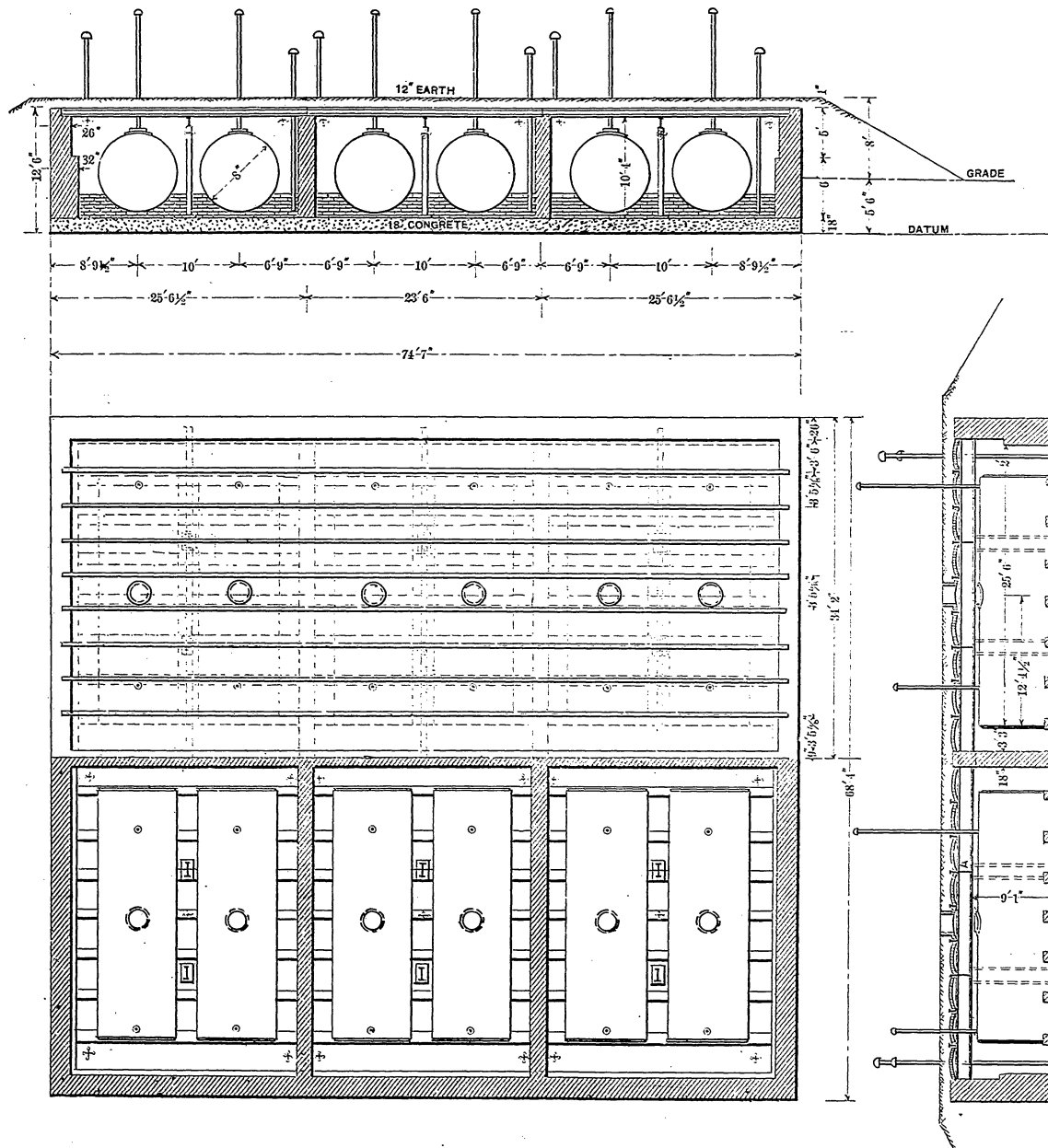


Fig. 6.—Plan and Elevations of Tank House.

FUEL OIL SYSTEM AT THE FAIR.

speed, and it is the work of but a moment to change from one to the other, in case of necessity. There is but one stand pipe, as there can be no contingency which would render a duplicate either necessary or desirable. Tracing out the system of piping, the

adjacent railroad siding, in case of emergency through any accident or stoppage of main supply by pipe line. By making the necessary setting of the several valves, the pumps draw from the cars and discharge through the main receiving pipe to the storage tanks.

In case of accident to the storage tanks, although a very remote contingency, the pumps may be made to draw directly from either the main or auxiliary receiving pipes, by simply changing the necessary valves. The oil pumps are 8 x 8½ x 10 inches stroke. They

are furnished by the Snow Pump Company, and are of the duplex direct-acting type, having suction and discharge chambers common to both cylinders. It will be noticed that there are two independent suction connections, one on each side of the pump, which, by means of their respective valves, determine the source of supply. Those on the inner sides of the two pumps, through the U pipe, connect directly with the storage tanks; and also through valve in T connection and 5-inch pipe with the main discharge pipe and overflow of stand pipe. By this arrangement it is readily seen that in case of accident not only can the delivery of oil to the distribution system be promptly stopped, but that the latter may be quickly emptied by the pumps and the contained oil delivered to the storage tanks. This may be accomplished either through the stand pipe overflow, or directly from the pumps through the discharge connection with main receiving pipe. In the former case the changing of three and in the latter of four valves are all that is necessary; and as these valves are all quick acting, and may be manipulated without stopping the pumps, the operation is under almost instant control. The discharge connections and the two independent delivery pipes are clearly shown in the drawing, and need not be specially referred to.

The stand pipe, Fig. 2, is of the closed top pattern, 30 inches internal diameter, by 39 feet 10½ inches from engine room floor to top. A 9 inch overflow pipe connects directly with storage tanks, the center of opening being 1 foot below the top of the stand pipe, while the connections with the pump discharge are 9 feet 6 inches above the floor line. The height of oil level is about 37½ feet above that of the burners in the boiler house, and this head gives a pressure of about 13 pounds. It will therefore be seen that instead of the oil being supplied to the burners by gravity pressure there is sufficient fall to the pipes in the other direction to empty them by gravity, and that the direct pressure of the pumps, regulated only by the stand pipe, is employed for the delivery, Figs. 4 and 5 show the details of the storage tanks, which need not be described. All the details of the two systems of piping for oil and steam are clearly indicated; and the necessary manipulations of valves may be readily traced. The drainage of the vaults is collected in a sump, from which it is discharged by a steam syphon ejector by simply opening a steam valve. The arrangement of heater coils in the tanks is shown by dotted lines in Fig. 4, and their connections with the steam main in the vertical section, Fig. 5.

The location of the vaults renders them entirely isolated from any buildings, and they are entirely surrounded by an earth embankment reaching to the top of the retaining walls. This feature, of itself, would render the storage system perfectly safe, as even in the extreme case of all of the tanks being disrupted—say by lightning—and their contents released, the oil would still be confined to the vaults, and if set on fire, by lightning or otherwise, could burn itself out without damage to the surroundings. The two sections, Fig. 6, illustrate this point, and also the method of ventilating the tanks by open pipes.

In Fig. 7 is shown the plan of the system of valves for controlling the distribution at the boiler house end of the line. The 6-inch pipe at the left and the 5-inch at the right hand are continued in a

direct course from the pump house, as shown in Fig. 1. They join in a common 8-inch pipe, and each is controlled by a valve close to + connection. The syphon is shown in horizontal position for convenience in making the drawing, and will be understood to stand upright. The entire arrangement of valves is extremely simple, and can be manipulated without danger of mistakes, as their locations indicate the portions of the system which each is intended to control.

As to the efficacy of the syphon there is room for question, and it may be mentioned that its use was entirely as a concession to the requirements of the Board of Underwriters.

A pavilion is used as a station for regulating the oil supply and also as a point

The receipt and consumption of oil by the system described necessitates the use of a very carefully arranged method of measurements and records thereof, as the most convenient—in fact, about the only practicable—means of ascertaining the quantities received and expended is by measuring the height of oil level in the tanks. An "outage" table was prepared by the National Supply Company, in which is shown the quantity of oil, in gallons, contained in the tank for each ¼ inch in depth up to the full 95½ inches, which is the internal diameter of tanks. Each tank is provided with an accurately graduated gauge, from which the oil level may be observed before and after receiving or expending and at periodical intervals. In these measurements it is, of course,

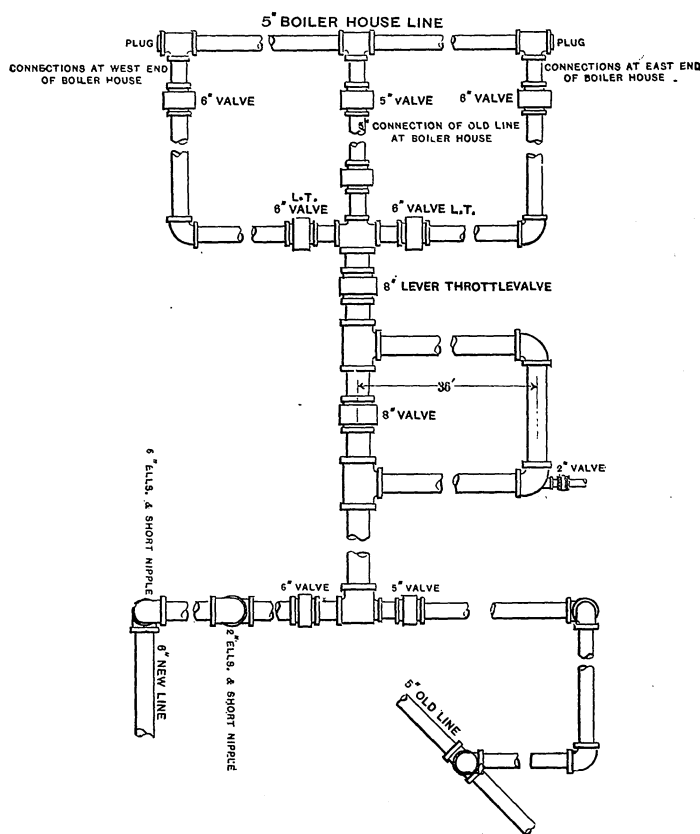


Fig. 7.—Diagram of Oil Pipe Connections in Boiler House.

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of observation of the chimneys of the boiler house, to detect any signs of smoking from careless or improper management of the fires. There is at all times, day and night, an attendant stationed in this building whose duties are to control the oil supply and also to act as smoke inspector. In the former capacity he has within easy reach all the necessary valves, as per Fig. 7, by which the flow of oil may be regulated, or, in case of accident, shut off instantly, regardless of the pumps, as the only effect on the latter in such case would be to cause the excess of oil delivered to pass through the overflow of the stand pipe back to the receiving tanks. Electric signals and telephone connections from the boiler house to the station and from the station to the pump house enable the firemen, inspector and pump attendants to communicate promptly with each other, so that no time may be lost in case of emergency requiring speedy action. A thorough and systematic smoke inspection is carried on and a daily report made.

very important to note the temperature of the incoming or outgoing oil, and convenient means are provided for the purpose. Reports of receipts and expenditures are taken from the record books and returned daily to the superintendent's office. The forms used are bound in books, and are in duplicate, the writing up being done by the use of the carbon manifold method to prevent discrepancies between original and duplicate, which might occur if any transcription plan were employed. The original is perforated for tearing out, while the duplicate remains in the book as part of the engineer's record. The form for oil received is printed in black ink, while that for consumption is in red. On the former record all settlements with the Standard Oil Company are made, which may be considered a very fair criterion of the accuracy of the system.

On the score of safety the plant certainly appears to meet all possible requirements. Its efficiency is fully demonstrated by five months of continuous

operation. As regards the question of comparative economy no tests have yet been made, and this point is, therefore, still to be determined. All machinery, material and instruments were furnished under contract by the National Supply Company, the labor by the Exposition Company, under the supervision of the former company. The entire engineering work was done by C. O. Billow, engineer of the National Supply Company, who has had long and extensive experience in the installation of oil fuel plants, and of whose work this is the crowning achievement.

THE WEEK.

The latest Cunarder "Lucania," which on her initial trip from Liverpool to New York beat all previous maiden records by a run of 5 days 15 hours and 37 minutes from Queenstown to Sandy Hook, made her second westward trip last week in 5 days 13 hours and 25 minutes, thus breaking the best former record—that of the American liner "Paris"—by 59 minutes. The chief engineer of the "Lucania" believes that she has not done her best yet, and that she may be relied upon to still further lower the time of transit by several hours.

Cuban papers contain complaints of a great dearth of good field laborers.

The first consignment of corn ever sent from Mexico to Europe will be shipped next week from land adjoining the Monterey & Mexican Gulf Railroad, Mexico.

Some important shipments of anthracite have been recently made to England, and inquiries are noted for quotations on American coal from Mediterranean and other foreign ports, where the difficulty of obtaining adequate shipments from Great Britain since the strike is being severely felt.

Improvements proposed by the Dock Board on the North River front of New York from West Tenth to West Twenty-third streets comprise 19 large piers, 80 feet wide and ranging from 466 to 729 feet in length, with a distance between each pier of 225 feet, thus allowing two steamers to unload at the same time. The inside cost of the undertaking is placed at \$11,000,000, but this would probably be materially increased if the whole scheme is carried out.

In the United States Circuit Court of Philadelphia on October 7, an injunction was obtained by the Edison Electric Light Company against the Westinghouse Light, Heat & Power Company for alleged infringement on incandescent lights.

Cuban sugar planters expect that the yield of next season will be a heavy one, and will enable them to retrieve the losses of last season, always provided that no cyclone visits the island during the present month. The appearance of the cane fields throughout the sugar region is described as very promising.

In illustration of the improvement which has developed recently in railroad freight traffic, the Philadelphia Times remarks that a few weeks ago the Pennsylvania Railroad had 16,000 idle freight cars standing along its various sidings. Reports received a few days ago showed that the number had been reduced to 6000. What is true of the Pennsylvania is also true of the Lehigh

Valley. Hundreds of its freight cars which have been lying idle for months back on the coal region side track are now reported as in demand for Western coal and grain traffic, and all the empties have been ordered for inspection, preparatory to forwarding them West.

Business in Havana is reported as paralyzed, owing to the refusal of the customs authorities to accept bank notes in payment of duties.

The opening of the Manchester ship canal, which is announced for January 1, 1894, will enable cotton steamers to land their cargoes close to the mills, thus saving railway freights and the expense of handling on the other side. The canal is likely to make Manchester a formidable rival to Liverpool as a British port of entry.

Advices from Hazleton, Pa., intimate uninterrupted activity in the coal trade for this season in the Lehigh region.

Owing to the accident to the cruiser "Montgomery," now at New London, Conn., the board of naval officers appointed to witness the trial of the vessel has been dissolved. It is estimated at the Navy Department that the accident and the delay will cost the builders, the Columbia Iron Works of Baltimore, fully \$25,000; but this sum, it is said, could be materially reduced if the contractors will allow the trial to take place at once, notwithstanding the damage. Admiral Belknap's official report shows that while the injuries to her hull are serious, they are not such as to disable her. The damage cannot be determined until the ship is put in dry dock, but it is estimated that \$10,000 will be necessary to repair her, and that the work will consume a month.

Orders have been sent by the Navy Department to Rear-Admiral Belknap, at New London, Conn., directing him to send out the dynamite cruiser "Vesuvius" on the unique and hazardous duty of blowing up 14 derelict vessels that endanger navigation. All the derelict vessels to which the "Vesuvius" is assigned were wrecked during the recent hurricane on the Atlantic Coast, and nearly all are adjacent to the Jersey shore.

The Bethlehem Iron Company shipped last week 64 tons of plate for the battle ship "Maine" to the national proving grounds at Washington. The plates are 8 x 15 feet, and 12 inches thick. These plates are the first service plates that have been Harveyized, and their trial will consequently be of interest.

Connection was made last week on the longest telephone line in the world except that between New York and Chicago. It stretches from Spokane, Wash., to Portland, Ore., by way of Puget Sound, a distance of nearly 600 miles.

The estimated quantity of gold yielded from the mines of Victoria, Australia, from 1851 to 1892 is 58,101,429 ounces, valued at \$1,115,547,437.

A piece of expeditious work is reported from New Jersey in the inauguration of the Newark and South Orange Railroad. After a bitterly contested litigation the company were, last Friday, granted a franchise for the erection of their trolley system by the South Orange Board of Trustees. Fearing an injunction might be obtained, they put 300 men to work on Friday night; poles were erected, wires strung, and electricity turned on at 10.40 a.m. on Sat-

urday, the first car being run over the line in a little over 12 hours from the time the franchise was obtained.

The largest oil tank steamer afloat is now loading in the port of New York. She is the British steamship Batoum, chartered by the Standard Oil Company. The vessel, which was built this year at Sunderland, England, has a capacity of 2,700,000 gallons of oil in bulk, which is fully 800,000 gallons more than any other tank steamer in the world can carry.

Encouraging results are said to be obtained from the exploration of the Piedras Negras coal mines of Mexico, which is being made for the C. P. Huntington interests.

Final estimates of the Kansas Board of Agriculture place the total wheat harvest of that State for the present year at 24,881,448 bushels, an increase of 5,000,000 bushels over the September estimate.

Treasury Decisions.

Wire Cloths and Nettings.

Before the U. S. General Appraisers at New York, September 6, 1893. In the matter of protest, 17,682b-62, of James McQueen, against the decision of the Collector of Customs at Detroit, Mich., as to the rate and amount of duties chargeable on certain wire cloth, imported per Grand Trunk Railway, November 5, 1892. Opinion by Sharretts, General Appraiser.

The merchandise in question is wire cloth and netting for milling purposes. We find as facts regarding the same:

1. The wire in the cloth—weight, 180 pounds—is smaller than No. 26 wire gauge, and costs 6 cents per pound.
2. The wire in the netting—weight, 45 pounds—is smaller than No. 16 and not smaller than No. 26 wire gauge, and costs 3 cents per pound.
3. The specific rate of duty provided in paragraph 148 for wire of the kind in question is greater than 45 per cent. ad valorem.

The Collector classified the merchandise as manufactures of metal, and assessed duty at 45 per cent. on its value in the finished condition. The appellant claims that the wire cloth is dutiable at 5 cents per pound and the wire netting at 4½ cents per pound, in accordance with the provisions of paragraph 148.

In our opinion the claim of the appellant is well founded. The merchandise is denominatively provided for in paragraph 148, and is subject to the specific duties provided therein for wire of corresponding size and value, and, in addition thereto, 2 cents per pound.

The protest is sustained and the Collector's decision is reversed.

From the annual report of the School of Mines, Victoria, Australia, it is learned that in the year 1892 the yield of gold in that colony showed an increase of 78,056 ounces over the output of the previous year, being the highest yield reported since 1886. The number of miners employed in the gold industry is 23,518.

Owing to the prolonged stoppage of operations at the rolling mills and blast furnaces in the Youngstown, Ohio, district, distress among the workmen is now reported, and public subscriptions are being raised for a relief fund. Generous amounts are being contributed.

The Iron Age

New York, Thursday, October 12, 1893.

DAVID WILLIAMS, - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Sheet Mill Situation.

It is now generally conceded that the situation of affairs between iron and steel sheet mill operators and their employees who still adhere to the rules and agreements of the Amalgamated Association is badly strained, although operations are being continued. In July of this year quite a number of concerns signed the scale agreed upon between manufacturers and the Conference Committee, but trade developments since that time have shown a downward tendency in values, and there is such a marked difference in conditions that concessions on the part of the workmen are asked for. If not granted there will be an effort made to secure them by a forced cessation of work, rendered absolutely necessary in consequence of the inequality between prices now paid for labor and current prices realized for finished product in comparison with last year's figures. It is not easy to determine what the solution of the difficulty is likely to be, for the reason that there is a split in the camp of the manufacturers as well as among the workmen, and it now appears that local circumstances may govern the agreements made between mill owners and their skilled workmen. Notwithstanding the fact that the same scale of wages has for many years past been signed by sheet manufacturers in various producing centers, it can be proved that many mills have had the advantage of concessions made by the workmen which were not in strict accordance with the rules and prices of their signed agreement, but at the same time justifiable, to enable their employers to run their mills at a fair profit on some particular class of work of which they made a specialty.

As the matter now stands only two important moves have been made in the direction of a general breaking up of organization among manufacturers, one being a reduction of 10 per cent. in wages made by the New Philadelphia Iron & Steel Company, New Philadelphia, Ohio, which must necessarily affect other nearby mills, and the withdrawal of the Apollo Iron & Steel Company from the Association of Iron & Steel Sheet Manufacturers. The last named concern have taken a decided stand, and their mills will not be started except upon a non-union basis. Other manufacturers have also indicated that they will withdraw and as a result of the general disruption, the various sheet mill districts may each have a special scale of wages and

code of rules. What may be satisfactory in the Wheeling district may be otherwise at Cincinnati, Canal Dover, Niles, New Philadelphia or other Ohio mills, and a difference in the class of work may require special terms with workmen employed in the mills of Western Pennsylvania or Indiana. Local conferences are numerous, but definite understandings are not reached; meanwhile mills are kept running filling special orders of an urgent character, after which they will shut down until wage matters are settled.

Railroad Construction in 1893.

An interesting statement with regard to railroad construction this year is made by the *Railway Age* of Chicago. The total new mileage laid during the first nine months of the year, as obtained from official sources, was 2040.85 miles. Ordinarily, at least 50 per cent. more track would be laid during the remaining three months, but from the present outlook it is regarded as doubtful if the total for the year exceeds 2500 miles. Details of the track laid in each State or Territory for the nine months are as follows:

Track Laid in First Nine Months of 1893.

State.	Lines.	Miles.
Alabama.....	5	46.
Arizona.....	1	42.
Arkansas.....	4	12.75
California.....	7	64.32
Colorado.....	2	16.76
Florida.....	7	103.50
Georgia.....	6	62.50
Idaho.....	1	5.57
Illinois.....	7	64.80
Indiana.....	5	21.10
Iowa.....	1	4.
Kansas.....	1	18.45
Kentucky.....	5	25.50
Louisiana.....	3	8.25
Maine.....	2	71.50
Massachusetts.....	2	11.13
Michigan.....	1	0.50
Minnesota.....	4	42.21
Mississippi.....	1	3
Missouri.....	7	139.95
Montana.....	1	27.
Nebraska.....	2	32.70
New Hampshire.....	1	1.
New Jersey.....	1	2.
New Mexico.....	1	2.54
New York.....	6	31.39
North Carolina.....	8	69.60
North Dakota.....	2	194.60
Ohio.....	5	134.70
Oregon.....	1	11.50
Pennsylvania.....	43	364.05
Rhode Island.....	1	5.21
South Carolina.....	1	14.
South Dakota.....	2	62.06
Tennessee.....	3	17.30
Texas.....	6	140.82
Utah.....	1	9.
Virginia.....	5	16.64
Washington.....	2	41.90
West Virginia.....	14	76.05
Wisconsin.....	3	19.
Wyoming.....	1	4.

Total in 42 States and Territories.....182 2040.85

If the estimate for the year proves correct, and the total new track laid does not exceed 2500 miles, the year 1893 will show a retrogression in this respect to the conditions obtaining in the period from 1874 to 1878, when the new track laid ranged annually from 1711 miles to 2712 miles. From present appearances the estimate will not be exceeded, as the rail mills of the country are all idle or running only spasmodically on very small orders, and if there was any considerable length of

track to be laid during the fall and early winter this would not be the case. Taking the condition of the country's finances the past summer, it is rather surprising that even this much work has been accomplished in new construction. It would have been in entire harmony with the general wreck of business if all such work had been completely stopped. Its continuance under such discouraging circumstances excites the hope that as soon as the disturbing elements now interfering with commercial interests are out of the way there will be considerable activity in this direction.

Railroad building has not been overdone in recent years, and there are numerous deserving projects for new lines and extensions that are only waiting propitious times to be launched on the financial sea. There was a sudden dip downward in railroad construction in 1885, when the new mileage fell slightly under 3000 miles in consequence of financial disturbance, but it was followed by a quick recovery the next year, when over 8000 miles of new track was laid. While the panic of 1884 which caused that depression in railroad building was by no means so serious as the recent crisis, still the nation's recuperative power at this time ought to be fully as strong if not stronger, should wisdom rule in pending national legislation. The currency and tariff questions should be settled speedily. With these out of the way, no longer menacing business of every description, new enterprises in railroad building as well as in other lines would again be undertaken and new vitality would be imparted to our languid manufacturing interests.

The Success of the American Tin Plate Industry.

The last report of Ira Ayer, Special Agent of the Treasury Department, shows that even at this early date the American manufacturers of tin plate have reached a state of development which brings them very near the attainment of the quantity called for by the tariff act. Even under the strictest interpretation of the law its requirements would now be met, if the financial panic had not interfered. Under the recent Treasury ruling only those tin and terne plates are counted as being American which have been made from black plates rolled in this country. The tariff act provides that the present duty shall stand if it can be shown to the satisfaction of the President of the United States that the American product of plates weighing less than 63 pounds per 100 square feet is equal to one-third of the importations in any one of the fiscal years up to June 30, 1897.

Thus far the year of lightest importations has been the fiscal year ending June 30, 1892. One-third of the net imports thus figure out 79,307,939 pounds. During the quarter ending June 30, 1893, the production of tin and terne plates from American black

plates was 18,264,225 pounds, of which about 94 per cent. were plates weighing less than 63 pounds per square inch, or say 17,167,000 pounds. To this must be added, according to law, 2,322,455 pounds of tinned or tinned articles made from American sheet iron or steel. This carries the total for the quarter, under the narrow lines fixed by the present Treasury officials, to about 19,489,455 pounds. If this rate is kept up for four successive quarters, covering a fiscal year, the American producers will have complied with the provisions of the act, because the product would be close to 79,000,000 pounds, which is the mark to be passed.

We know that full capacity had not been attained in the quarter ending June 30, 1893, although it did show an advance from 14,102,299 pounds to 20,586,680 pounds, comparing it with the preceding quarter. It is quite sure that if general business is in a normal condition the manufacturers of tin plate in this country can make from American black plates a sufficient quantity to meet the requirements of the law. The only point concerning which any doubt might possibly arise is whether our sheet mills are now in a position to readily supply the needed annual quantity of 75,000,000 pounds of plates lighter than 63 pounds per 100 square feet.

We took occasion recently to criticize the tables relating to capacity issued by the Treasury Department and printed in *The Iron Age* of September 14. The table then printed assigned to makers of tin plate from American black plates an annual capacity of about 30,250,000 pounds, based on three and one-half times the product of the quarter ending March 31. At the time of the publication of that article there were in the possession of the Department the sworn returns of the manufacturers for the last quarter of the fiscal year. These show an actual make of over 18,000,000 pounds, or at the same rate of figuring, by multiplying by three and one-half, an annual capacity of about 64,000,000 pounds, or double the estimate of the Treasury officials. We believe that no more evidence than this is required to show what means are resorted to by hostile officials to create impression adverse to a rapidly developing industry. We need hardly add that we do not hold Ira Ayer responsible for work so little worthy of Government officials.

Davies & Co.'s automatic galvanizing machine is rapidly making headway among the manufacturers of galvanized sheet iron in this country. The Whitaker Iron Company of Wheeling are putting in a second machine, and so are the Cambridge Iron & Steel Company of Cambridge, Ohio. The New Philadelphia Iron & Steel Company of New Philadelphia, Ohio, have just put in one machine. The Falcon Iron & Nail Company of Niles, Ohio, are also making arrangements to introduce the process in their works on quite an extended scale.

Supplementing the announcement made in the last issue of *The Iron Age* to the effect that an agreement between the rolling mill operators of the Ma-

honing Valley and the two associations of workmen was not probable to occur comes the information that the manufacturers have refused flatly to enter into any further negotiations with the men except as individuals. Upon this understanding old employees will be dealt with, but as a body representing any organization they will no longer be recognized.

"Julian Bessemer," an Imposter.

A few weeks since a young Englishman called upon a number of iron and steel manufacturers of the Mahoning Valley, representing himself to be a grandson of Sir Henry Bessemer, and, presenting a card, upon which was printed "Julian Bessemer, Sheffield, England," he claimed to be in need of funds, and endeavored to obtain social recognition. Suspicion was aroused, and J. G. Butler, Jr., president of the Mahoning and Shenango Valley Manufacturers' Association, communicated with Sir Henry Bessemer, from whom the following reply was received:

165 DENMARK HILL, SURREY, {
September 21, 1893. }

JOS. G. BUTLER, JR., ESQ.,

DEAR SIR: I duly received your favor of the 10th inst. and beg to thank you very much for the trouble you have so kindly taken in giving me the information which your letter contains in reference to a person falsely representing himself to be a grandson of mine.

In reply to your letter allow me to inform you that I have only six grandsons, each of whom I am in the habit of seeing or hearing from almost every week. I may add that not one of my grandsons has ever been in the United States, nor is there any such person as "Julian Bessemer" a resident of Sheffield, England, or I must long since have heard of him; nor have I or any of the Bessemer family ever resided in Sheffield, although I had a works there managed by my partner.

The simple fact is that in England there are only nine males living of the name of Bessemer, that is, my two sons, and my six grandsons, and my nephew, a gentleman over 40 years of age.

I am, therefore, forced to conclude that the young man who called on you has simply assumed the name of Bessemer for the purpose of obtaining money from some of the many gentlemen in America who have honored me by taking a deep interest both in me and in the invention which bears my name.

I beg to remain, dear sir,

Yours very sincerely,
HENRY BESSEMER.

The young man is described as 5 feet 7 inches tall, slender, with florid complexion, a smooth face and talkative to a degree beyond garrulity. He described accurately the Liverpool reception of the American engineers in 1889, naming a number of Englishmen who were present.

The description given tallies with that of a young person who some time since victimized Americans as a nephew of Sir Joseph Wentworth, and it is possible that it is the same who assumed the title of a nephew of Sir Lowthian Bell. It is needless to add that American manufacturers and engineers will do well to scrutinize carefully the credentials of any person claiming relationship with leading English manufacturers and inventors. The youthful fraud will probably quickly abandon the business when it ceases to pay.

The setting up of the machinery at the Watervliet, N. Y., Arsenal is progressing rapidly. It is expected that everything will be in readiness to start the new plant by winter. The Pond Tool Company have fulfilled their contract and erected all the lathes and other

machines specified. The Niles Tool Company have yet one large turning and boring lathe to put in position. This will be complete in about two weeks. After that all the lathes and smaller machines will be given the finishing touches and the new south wing will be ready for operation. A number of other improvements for general convenience and the comfort of employees are being made about the works.

Engineers Society of Western Pennsylvania, Pittsburgh, Pa.—The regular meeting of the society was held on September 19, thos. H. Johnson in the chair. The papers read at the June meeting on "Gas and Gas Producers," by Walter E. Koch, and on the "Effect of Suddenly Applied Loads Upon the Tensile Strength and Other Properties of Iron and Steel" were fully discussed. Charles Hyde gave an interesting discussion on "Water Tube Safety Boilers," illustrating his remarks by a working model of the Hyde water tube safety boiler. On September 22 and 23 the visiting French engineers were entertained by the society. On the 22d an excursion took place by railway to the MacDonald oil and gas field and to the coal mines of the Pittsburgh Consolidated Coal Company. On the 23d a visit was made by steamboat to Homestead, McKeesport and Davis Island Dam. Very many of the largest and most important steel works, electric plants, inclines and street car power houses were also visited. On the evening of the 23d the members of the committee of the Engineers' Society and of the manufacturers of the city were the guests of the French engineers at a dinner at the Monongahela House. At the meeting of the chemical section on September 26 the subject of "Standard Methods for Sampling and Analysis of Iron and Steel" was discussed. Jas. O. Handy read a paper on "The Effect of Arsenic on Phosphorus Determinating in Iron and Steel."

Another deflection from the lines of the Amalgamated Association of Iron and Steel Workers has recently been made. The roll turners of the United States were represented at a meeting held in Pittsburgh last week and the initial steps taken to form a separate organization. Roll turners from all important districts were present and agreed unanimously to sever their allegiance from the association of which they had long been members, but which, according to their claims and statements, had never rendered them the practical benefits promised when they joined.

Industrial establishments at Muncie, Ind., including several rolling mills and other important manufactories, are harassed considerably, owing to the town being placed in a state of quarantine on account of smallpox. Whether needed or not no workmen or any other persons are allowed to pass in or out of town, and the relatives of workmen from the East, who are employed there, are seriously worried over the dearth of news in regard to the exact condition of affairs.

Stockholders in the American Steam Boiler Insurance Company have filed a petition that the Attorney-General move for the appointment of a receiver for that concern.

CORRESPONDENCE.

A Proposed Combination of the Blast Furnace and the Bessemer Converter.

To the Editor: I have for many years considered that the ordinary blast furnace is not absolutely perfect, but is capable of improvement and modification. When I have suggested this to my friends they have been shocked at my audacity and heresy, but have failed to show me that I am in error. Knowing that Americans are not so prejudiced and are more liberal than we English, I venture to ask some of your readers to carefully examine the question and to put me right on this important subject.

My theory is, that by a combination of the Bessemer converter and blast furnace, pure iron can be smelted rapidly (even from phosphoric ores) with less fuel than is now required, and that the escaping gases will contain less nitrogen and more combustible gas than any Siemens gas obtainable from the best known gas producers. I have arrived at this opinion for various reasons, among others because:

1. When iron ore is smelted in the blast furnace a certain proportion of slag is necessary in order to wash down the reduced iron, and also to prevent it being reoxidized by the blast of air which enters at the tuyeres, consequently very rich ores cannot be smelted in the blast furnace without the addition of slag producing materials. Whereas, in the proposed furnace (or in a modification of the Bessemer converter and Siemens regenerative furnace) there would be no free oxygen present to reoxidize the reduced iron, because the oxygen in passing through the molten metal would be converted into carbonic oxide, which would assist in reducing iron, and the fusion of the metal would be completed by contact with the molten bath, thus avoiding any necessity for slag.

2. Rich ores or even the fuel used will contain some silica, and it is therefore necessary to add sufficient basic materials to rather more than neutralize the silica and other acids, so that any phosphoric acid present will be neutralized and retained in the slag, preference being given to alkalies, so as to produce a liquid slag, which is facilitated by the high temperature of the Bessemer as compared with the blast furnace operation.

3. The escaping gases will contain less nitrogen and more carbonic oxide, because only air is introduced in the Bessemer operation and the oxygen from the ores combines with carbon and thus increases the proportion of combustible gas as compared with nitrogen.

4. The reduction of iron in the presence of free carbon takes place at a comparatively low temperature. In 1869, when making metallic coke, part of the oxide was reduced in the coking operation, and afterward, when Thomas Blair used the metallic coke at John Brown & Co.'s Atlas furnaces, Sheffield, reduction took place rapidly, for the metal contained in the coke was smelted in 12 hours instead of 36 hours, the time usually required with the ordinary charge of ore and coke. The metallic coke contained an excess of carbon, and some of the coke, after yielding up its metallic contents, was withdrawn at the tap hole; this leads me to believe that by using a small excess of carbon a zone of carbon would be maintained above the molten bath.

5. The reduction and fusion of the iron must be a very rapid operation if 0.7 ton Fe—say 14 hundredweight—is to be reduced during the short time that would be occupied in oxidizing in the Bessemer portion of the furnace 0.225 carbon from the molten bath, consequently it will be advisable and may be even necessary previously to pulverize the ore, because the smaller the ore the more contact there would be between the oxide of iron and free carbon, and it would be also well and with poor ores necessary to separate from the oxide of iron as much of the extraneous gangue or foreign matter as possible, so as to enrich the ore and reduce the slag producing materials. This can be done by the magnetic separator or by specific gravity aided by water or air or in any way found most convenient. The powdered oxide of iron, small coal and basic materials should be intimately mixed together, and it might be even advantageous to add bitumen and press same into blocks or metalliferous briquettes before introduction into the furnace.

The calculations hereunder are based on the following assumptions: 1. That crude molten iron is Bessemerized in the ordinary way, but that the upper part of the converter is somewhat like a blast furnace, having above the molten bath a zone of carbon, and above that zone carbon and small iron oxide, the latter as free as possible from extraneous matter; sufficient lime or other bases having been added to more than neutralize all the silica present in the charge, so as to produce a sufficiently basic slag—i. e., the oxygen in the bases must be in excess of the oxygen in the silica and other acids present.

2. That the Bessemer converter has a carbonaceous neutral lining, and is so constructed that when the molten bath exceeds, say, 40 tons, and rises above a certain height, the excess flows off into a Siemens furnace or into another Bessemer converter, where the slag is withdrawn and the crude iron is converted into steel.

3. That the crude iron is introduced at 1650° C., and the excess withdrawn or flows off at the same temperature.

4. That after the crude molten iron is first introduced and until the furnace is white hot, only carbon is added, and

free carbon will take up sufficient carbon by impregnation, so that not less than 0.225 carbon is oxidized in the Bessemer operation during the time the 0.7 Fe is being reduced by means of a further quantity of carbon from 1.0 Fe₂O₃—viz., 0.225 C, so that altogether 0.45 C is used to smelt 0.7 Fe,—i. e., equivalent to about 15 hundredweight coke per ton of iron smelted, or, say, 20 hundredweight bituminous coal. The furnace should be fitted with appliances for collecting the products of distillation, and when coal is used, additional carbon will be required for distilling off the volatile products of decomposition.

6. That the nitrogen, carbonic oxide, hydrocarbons, ammoniacal liquor, &c., pass off at a temperature not exceeding and probably considerably less than 300° C.

7. That only iron is reduced, not silicon, phosphorus, &c., and this should be the case, because the reduction of iron takes place at a comparatively low temperature, and basic materials are present so as to produce a sufficiently basic slag.

8. That the time occupied in reducing 14 cwt.—i. e. 0.7—Fe is five minutes, viz.: the time occupied in oxidizing 0.225 carbon in the Bessemer operation. This would be equivalent to the reduction of 200 tons of iron in 24 hours—i. e., 0.7 Fe × 12 × 24 = tons 201.6.

9. That the pressure of blast is 20 pounds per square inch and that 0.3 oxygen × 12 × 24 = 86.4 oxygen + 289.2 nitrogen, i. e., 375.6 tons air are driven through the molten metal in 24 hours, or 0.261 ton of air per minute.

10. That the escaping gases will be composed of about equal quantities of carbonic oxide and nitrogen besides hydrocarbons, &c., viz.: Tons in 24 hours, 289.2 nitrogen, 86.4 oxygen + 86.4 oxygen + 64.8 carbon + 64.8 carbon—i. e., 289.2 nitrogen + 302.2, carbonic oxide + hydrocarbons, &c.

11. That the ore introduced is Fe₂O₃, but if magnetic iron ore, for example Marbella iron sand, is used, the quantity of carbon required for reduction would be proportionately reduced, whereas spathic iron ore would require an additional quantity of fuel to calcine and drive off the carbonic acid from the ore.

In Bessemer Converter. Heat Obtained by Oxidation.

0.225 carbon + 0.3 oxygen = 0.525 carbonic oxide. 0.225 × 5366 (calorific value C + O) =	1,207.35
1 Fe ₂ O ₃ = 0.7 Fe + 0.3 oxygen	
0.3 oxygen × 6216 (calorific value of 1 liter oxygen)	
(1 liter of oxygen weighs) 1.4298 grams	
0.225 carbon + 0.3 oxygen = 0.525 carbonic oxide. 0.225C × 5366 (calorific value of C + O) =	1,207.35
Net loss of heat in reduction of iron from Fe ₂ O ₃ =	96.89
0.7 Fe × 0.114 (specific heat of Fe) × 1650° C. (temperature of bath) = ...	131.67
Evaporation of Water :	
0.5 coke × 10 per cent. = 0.05 × 540 heat units =	27.00
1.0 ore × 0.5 per cent. = 0.05 × 540 heat units =	27.00
Fusion of slag, 0.1 slag × 550 heat units =	54.00
Carbon impregnation, 0.225 × 2400 heat units =	55.00
These 540 heat units should probably be omitted, because the crude iron afterward gives up the carbon when oxidized in the Bessemer converter.	540.00
Transmission of heat through walls, say	30.00
Escaping Gases :	
0.525 CO + 0.525 CO + 1.05 nitrogen = 2.1 × 0.245 specific heat × 300° C. =	154.35
Margin to cover sundry minor factors omitted	145.44
	1,207.35

afterward carbon and iron ore in the proportion of two of oxide of iron to one of carbon.

5. That the partially decarburized iron being constantly in contact with

The advantages may be briefly summarized as follows:

1. Economy of fuel.

In blast furnace practice about 0.6 slag is produced to 1.0 Fe smelted,

whereas in the proposed furnace the slag will be reduced to a minimum.

0.6 slag to 1.0 Fe in blast furnace practice.

0.15 slag to 1.0 Fe in proposed furnace.

Economy, 0.45×540 heat units = 248 heat units.

In the ordinary Bessemer converter the resulting carbonic oxide is wasted, and a large amount of heat is dissipated in the air by the escaping nitrogen and carbonic oxide.

If we take 0.225 carbon thus oxidized we have 0.525 carbonic oxide per ton of iron smelted + 1.05 nitrogen, and assuming in the Bessemer the gases escape at 900°C . instead of 300°C ., the difference of temperature is 600°C .—i.e., $1.575 \times 0.245 \times 600^{\circ}\text{C}$. = 231 heat units lost.

2. The smelting will be much more rapid than in the blast furnace and would consequently decrease the loss of heat by transmission through the furnace walls, and one of the proposed furnaces will smelt more iron than any ordinary blast furnace.

3. Large quantities of rich gaseous fuel are liberated and afterward utilized, being invaluable for metallurgical purposes where high temperatures are required.

4. As small ore is preferred, poor ores can be crushed and enriched, or metallic sand, "blue billy" and other small ore can be utilized which does not find a ready market with blast furnace proprietors.

5. As iron is reduced at a comparatively low temperature and the fusion takes place at the molten bath, it is possible to use inferior fuel, taking care that same contains sufficient carbon for the operation, including any carbon required for driving off moisture, destructive distillation, &c., as well as for reduction of iron and fusion of iron and slag. For example, where coals are scarce and peat plentiful, the peat could be intimately mixed with the iron oxide and necessary basic fluxes. The alkalis present in the peat would assist to produce a liquid slag and the heat from the escaping gases would be utilized in driving off the moisture from the metaliferous peat briquettes.

For experimental purposes a simple and inexpensive furnace would be one similar to what was used in April, 1879, at John Brown & Co's Atlas Works, Sheffield, vide a paper read before the Society of Arts on April 30, 1879, "A New Application of Rapid Oxidation by which Sulphides are Utilized for Fuel," viz.: A cupola fitted with a Bessemer bottom. At the back of the cupola a forepart was built of fire brick connected with the cupola by an aperture in the side of the latter, in order that the molten material undergoing oxidation might freely communicate with a quiet hearth. A drawing of this furnace will be found in the Society of Arts Magazine, May, 1879.

In the good old times I should not have contented myself with putting my crude ideas into writing, but preferably would have tried to confirm or rectify my opinion by experiments. To-day, unfortunately, I cannot afford to do this. May I hope that some good Samaritan Bessemer manager in the United States or elsewhere may consider it worth while to try the following simple but crucial experiment: Run an ordinary Bessemer converter with a carbonaceous lining (composed of coal dust, bitumen and clay, coke the lining) and Bessemerize therein a charge of molten non-silicious iron, adding to the bath oxide of

iron in small pieces, iron sand or "blue billy," together with an excess of coke. Weigh the iron before and after the operation. If it is found to have lost in weight it would appear as if no reduction had taken place, but if it had gained in weight it would prove that part of the oxide of iron had been reduced, and in that case I feel sure further more important experiments would follow and my theory would have a fair chance of being thoroughly thrashed out.

Apologizing for troubling you with so long a letter, I am, sir,

Yours faithfully.

JOHN HOLLWAY.

LONDON, September 16, 1893.

[We print the above letter as a matter of some interest, without indorsing its theoretical premises or assenting to the conclusions drawn from them.—*Editor The Iron Age.*]

David Bell of Buffalo, N. Y., who for 48 years has carried on a successful iron and steel shipbuilding works, has been forced to make an assignment to Thomas Macnoe. The shop has been reopened and will run full blast under the management of Receiver Macnoe.

OBITUARY.

PHILO BEVIN.

Philo Bevin, treasurer of the Bevin Bros. Mfg. Company, East Hampton, Conn., whose death occurred recently, was one of the pioneers in the manufacture of bells in this country. Mr. Bevin was born August, 1813, at East Hampton, and was thus an octogenarian at the time of his death. With two brothers he began the business in 1838, at East Hampton, the style of the firm having been Bevin Bros. In 1868 the business was incorporated under the name of the Bevin Bros. Mfg. Company. One of Mr. Bevin's brothers died in 1884, while the other brother survives him. The line of goods manufactured at the start consisted of sleigh, hand and house bells. A horse and tread-wheel furnished the power that was needed. In those days the facilities for shipping goods were very unsatisfactory and much energy and indomitable perseverance were essential to business success, qualities which Mr. Bevin possessed to a large degree. For six months in the year or more the goods were taken to a steamboat landing on the Connecticut River, three miles distant, for transportation to market; but when navigation closed a distance of 17 miles, and sometimes 25 miles, had to be traveled to reach a shipping point. Goods were shipped to New York, Boston, Philadelphia and Baltimore.

DELAVEN P. SMILEY.

Delaven P. Smiley, secretary and treasurer of the Michigan Foundry Company, and well known throughout New York and Pennsylvania, died at Battle Creek, Mich., on the 7th inst.

ARTHUR F. WENDT.

Arthur F. Wendt, the mining engineer, who died of disease of the kidneys on October 5, in Berlin, was the son of Charles E. Wendt. He was born in 1852 in Milwaukee. In 1873 he was graduated from the Columbia School of Mines and immediately began his career as an engineer in an iron mine on the Hud-

son River, New Brunswick, at iron and coal mines of Maryland and Pennsylvania, the manufacture of spiegeleisen, and at the copper mines of Tennessee and Arizona. In 1886 he was called to the silver mines of Potosi, and the Huanchaca silver mines of Bolivia. For the latter he designed and built a very large plant, the most prosperous in South America. It was there that he contracted the painful disease from which he died.

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., October 9, 1893.

The chief constructor of the United States navy, Philip Hichborn, has completed his report on the work of the Bureau of Construction and Repair, of which he is the chief, and has submitted it to the Secretary of the Navy. This is the first annual report of this efficient officer of the navy since his assignment to the head of the Construction Department. He is undoubtedly one of the most accomplished officers in this branch of the service. In 1883 Secretary Chandler assigned him to the responsible duty of visiting the navy and ship yards of England, France, Germany and Russia and obtaining information and plans which might be utilized in the great work of rebuilding the American navy according to the latest methods and of modern designs and material. Mr. Hichborn prepared an elaborate report on the subject, which was really the foundation of the renaissance in American naval architecture. In a conversation with the correspondent of *The Iron Age* the Chief Constructor said:

The past year has been marked by the usual activity in the construction of the new ships. It has also been particularly characterized by visible results, as some of the larger ships which were commenced in 1891 and 1892 have been launched during the year. There are 20 vessels without the monitors undergoing completion, and more than one-half of these are now in the water.

We are constantly studying up new designs, but not with reference to any particular vessels until they are authorized by Congress, then we adapt all the best results of our labors in that direction to the class of vessel to be built. We have always plenty of time from the date of the authorization by Congress until the advertisements for contracts are prepared to make the plans and specifications.

The condition of the unfinished ships shows a satisfactory state of forwardness.

There are being Built in the Government Yards.

Name.	Final delivery of armor.	Date of completion.
At New York—		
Maine.....	Jan. 1, 1894.	Sept. 1, 1894.
Puritan.....	Jan. 1, 1894.	July 1, 1894.
Terror.....	Oct. 13, 1893.	Feb. 15, 1894.
Cincinnati.....	Oct. 13, 1893.	Jan. 15, 1894.
At Mare Island, Cal.		
Monadnock.....	April 1, 1894.	Aug. 1, 1894.
At Norfolk Va.		
Amphitrite.....	April 1, 1894.	Aug. 1, 1894.
Texas.....	Depending on armor.	June 30, 1894.
Raleigh.....		Nov. 1, 1893.
Gunboats 7, 8 and 9.....		Nov. 1, 1895.

In Private Shipyards.

Name.	Final delivery of armor.	Date of completion.
At Baltimore— Iron Works: Castne	Sept. 30, 1893.	Sept. 30, 1893.
Katahdin	July 1, 1894.	April 1, 1893.
At Baltimore— Columbia Iron Works: Montgomery	Nov. 1, 1893.	Nov. 1, 1893.
At New York— Quintard's: Marblehead	Dec. 30, 1893.	Dec. 30, 1893.
At Dubuque— Ericsson	June 30, 1894.	June 30, 1894.
At Philadelphia— Cramp's: Brooklyn	July 1, 1895.	July 1, 1896.
Iowa	July 1, 1896.	Oct. 1, 1896.
Columbia	Aug. 1, 1893.	Feb. 1, 1894.
Minneapolis	Oct. 1, 1893.	Aug. 1, 1894.
Indiana	July 1, 1894.	Oct. 1, 1894.
Massachusetts	Jan. 1, 1895.	April 1, 1894.
At San Francisco— Union Iron Works: Oregon	July 1, 1895.	Oct. 1, 1895.
Olympia	Oct. 1, 1893.	Dec. 1, 1893.

On the 17th of the present month proposals for the new gunboats will be opened. Two of the gunboats authorized are for Chinese waters and one for general service. Their designs will adapt them to the character of duty they are to perform. This will complete the list of vessels of all types authorized by Congress and uncontracted for. The "Brooklyn" and "Iowa," both armored vessels, have just been commenced and the contract with the Cramps requires their completion by July 1 and October 1, 1896, respectively.

Well, if the present Congress does not authorize more ships the navy yards will have to stop. The last of the large ships being built by the Department will be finished next year, but I have no doubt this Congress will authorize further additions in large and small ships in order to keep the work moving along steadily.

The Columbian Naval Review would have been practically impossible, as far as we were concerned, if we had not commenced when we did to build modern ships. We rather surprised the maritime nations of Europe with what we already had in the way of new, modern ships.

If the review had taken place next year instead of this, we would have surprised them more. Their chief officers, who keep in line with the naval progress of other countries, did not withhold expressing their surprise at what we had done. Less than ten years ago we had practically nothing. In the international review last spring we made a most excellent showing. We were not ashamed by any means of what we had to present.

The best tribute to the success of the United States Navy in marine design and construction in all branches, but particularly in the case I will mention in hull design and construction, was experienced this summer. Captain Wietrich, one of the chief constructors of the German Navy, spent more than a week in this bureau studying up our methods of designing and general administration of the Construction Department of our Navy. He said to me that it was the most perfect system in the world in scientific calculations, excellence of execution in designs, and perfection in methods. He could not adequately express his admiration of the delicate mechanism of detail which we applied. He left us in a most enthusiastic frame of mind over our American methods. Not long after I was astonished to find the German con-

structor back again. It appears that he had been to Berlin and made his report, which was so surprising to the German marine authorities that the Emperor ordered him back to make further studies of our system.

But this was not the only experience of this character. Among the distinguished foreign expert visitors to our bureau were Captains De Russy and Martine, chief constructors in the French Navy. They were a week with us, and went away full of compliments for the superiority of our system of administration in matters of construction over that of France and, so far as they knew, of other nations. We also had a Spanish naval constructor here, and this very day a Japanese naval officer called upon me with letters of introduction and requested permission to study our system.

These are only recent cases. The tide of inquiry is now coming from Europe to us, instead of our going to Europe. We to-day lead the pace of progress in naval architecture in the world. We will not only keep it, but if Congress authorizes the ships we will still further distance all competition and rivalry.

The explanation of our rapid advance is easy. In European naval establishments everything is secret; in fact, it is considered treason to give out any information. It is the reverse with us. We let the world know what we are doing. We invite criticism, and when they discover anything wrong they are quick to agitate it. We take all the expert journals in the world and have men employed to read them and report. So we have the best of other nations and profit by their criticisms.

I presume the Secretary will confer with the Senate and House committees and ascertain how much they are disposed to grant for new ships next year, and upon that will base his recommendations. This bureau is now equipped for any amount of new work Congress may see fit to authorize.

I am quite sure we can go beyond anything we have yet accomplished in this branch, and further astonish the maritime nations. There is no reason why we should not have within a few years the most formidable naval fleet on the globe. We have the national wealth, resources, materials, experience and expert skill.

Trade Publications.

WE HAVE RECEIVED from E. H. Kinsley & Co. of Cincinnati, Ohio, an illustrated catalogue of their supplies and machinery for railways, mines, machinists, mills, contractors, &c. The book measures 11 x 9½ inches and contains 1168 pages. Some idea of the field covered may be had from the fact that the index alone covers over 14 pages. Heavy, calendered paper is used, and the engravings are sharp and clear and well printed. The catalogue begins with a description of stationary and portable engines and boilers of different types, hoisting engines, ore crushers, rock drills, steam pumps, air compressors, planing and shaping machines, drills, lathes, milling machines, bolt cutters, pipe machines, wire straightening and cutting machines, shears and punches, presses, power hammers, bending rolls, boring machines, riveting machines, grinding machines, metal sawing machines, saw mill machinery, &c. There are also described small tools and fittings of all kinds. Considered as a whole, the catalogue is one of the most complete ever issued by a machinery supply house.

Port Royal, S. C., celebrates this week the introduction of direct steamship communication with Europe.

A Further Decline in Pig Production.

100,000 Tons per Week since June 1.

The general expectation that October 1 would witness an even smaller furnace capacity at work than September 1 has been fully realized, the anthracite furnaces this time being responsible for the greatest decrease. At the beginning of this month we were producing at the rate of say 3 850,000 tons per annum, against a normal rate of output of 9,000,000 gross tons. In other words, we are making considerably less than half the quantity of metal. The most discouraging fact is that consumption does not seem to proceed at a much greater pace, since our stock statistics indicate a slight gain rather than a decrease in accumulated supplies.

On October 1 the active furnace plant, grouped according to fuel used, processed the following weekly capacity:

Fuel.		
Anthracite	34	15,338
Coke	52	53,061
Charcoal	28	5,496
Total, October 1	114	73,895
Total September 1	125	83,434

Decrease

The weekly product of all the furnaces on October 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
October 1, 1893	114	73,895
September 1	125	83,434
August 1	169	107,042
July 1	220	153,762
June 1	244	174,029
May 1	251	181,551
April 1	255	178,858
March 1	255	176,978
February 1	251	171,201
January 1	246	173,068
December 1, 1892	246	176,271
November 1	244	171,082
October 1	236	158,027
September 1	236	151,648
August 1	238	155,136
July 1	254	169,151
June 1	269	173,674
May 1	263	177,886
April 1	280	185,462
March 1	305	193,902
February 1	308	187,388
January 1	305	188,082
December 1, 1891	298	188,135

The position of the charcoal iron industry is shown in the following table:

Charcoal Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England	13	5	390	8	570
New York	5	0	0	5	585
Pennsylvania	13	2	154	11	761
Maryland	6	2	125	4	300
Virginia	13	0	0	13	827
Ohio	9	5	407	4	173
Kentucky	3	1	81	2	200
Tennessee	8	2	662	6	396
Georgia	3	1	245	2	230
Alabama	13	4	1,052	9	2,140
Michigan	20	3	1,072	17	5,111
Missouri	2	1	340	1	293
Wisconsin	4	1	743	3	1,127
Texas	4	0	0	4	603
Washington	1	0	0	1	100
Oregon	1	1	225	0	0
Totals	118	28	5,496	90	13,416

As compared with previous months, the record of active charcoal furnaces stands as follows:

	Furnaces in blast.	Capacity per week.
October 1, 1893	28	5,496
September 1	28	5,700
August 1	34	5,563
July 1	35	7,224

June 1.....	34	8,034
May 1.....	38	8,595
April 1.....	38	8,729
March 1.....	36	8,633
February 1.....	37	8,934
January 1.....	38	8,865
December 1, 1892.....	41	9,509
November 1.....	42	9,540
October 1.....	39	9,174
September 1.....	42	9,657
August 1.....	41	8,331
July 1.....	42	9,964
June 1.....	48	11,613
May 1.....	40	10,100
April 1.....	44	10,859
March 1.....	50	11,734
February 1.....	49	10,991
January 1.....	48	11,164
December 1, 1891.....	52	11,033

Chatham, in New York, stopped on the 17th ult.; Isabella, in Pennsylvania, resumed on the 23d; Bloom and Mount Vernon, in Ohio, also resumed in September, while Oswego, in Oregon, was also added to the active list. In Alabama Gadsden blew out in September.

The status of the coke furnaces was as follows on the 1st inst.:

Coke Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	7	0	0	7	5,247
Pennsylvania:					
Pittsburgh district.....	25	15	24,246	10	16,082
Spiegel.....	1	0	0	1	1,000
Shenango Val. Juniata and Oonemaugh Valley.....	16	1	702	15	13,700
Spiegel.....	1	0	0	1	575
Youngbush Valley.....	3	0	0	3	2,215
Miscellaneous.....	4	1	650	3	1,850
Maryland.....	5	2	2,900	3	3,038
West Virginia.....	1	0	0	1	250
Wheeling District.....	8	1	1,400	7	6,655
Ohio:					
Mahoning Val. Central and Northern.....	15	3	4,320	12	10,074
Hocking Val. Hanging Rock.....	11	3	2,093	8	6,203
Indiana.....	14	0	0	14	3,741
Illinois.....	14	1	94	13	3,068
Minnesota.....	2	0	0	2	412
Wisconsin.....	19	0	0	19	26,875
Missouri.....	1	0	0	1	629
Colorado.....	5	0	0	5	4,010
The South:					
Virginia.....	3	0	0	3	3,572
Kentucky.....	6	0	0	6	1,800
Alabama.....	22	8	4,877	14	7,155
Tennessee.....	7	0	0	7	3,243
Georgia.....	35	11	8,453	27	14,390
N. Carolina.....	14	2	1,093	12	5,387
Totals.....	261	52	53,061	209	148,940

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
October 1, 1893.....	52	53,061
September 1.....	54	56,876
August 1.....	54	77,607
July 1.....	122	117,072
June 1.....	140	132,079
May 1.....	146	139,788
April 1.....	145	135,488
March 1.....	145	138,579
February 1.....	140	129,396
January 1.....	138	131,731
December 1, 1892.....	136	133,160
November 1.....	133	130,673
October 1.....	128	118,895
September 1.....	128	114,538
August 1.....	131	117,984
July 1.....	140	127,433
June 1.....	145	128,852
May 1.....	147	132,313
April 1.....	152	138,116
March 1.....	163	143,490
February 1.....	167	138,268
January 1.....	163	138,611
December 1, 1891.....	162	142,747

Considering the current state of affairs the Pittsburgh district has held its own in an astonishing manner. In fact, nearly one-half of the total production of coke iron in the country comes from Allegheny County. The Wheeling district, the Valleys, other sections of Western Pennsylvania, Northern Ohio,

and above all Illinois, have all suffered far more. In Illinois, Wisconsin and Minnesota there was not a single coke furnace in operation on the 1st of the month. In Virginia, Alabama, Tennessee and Georgia, all of whose plants practically work for the open market, the product has dropped to a weekly rate of 15,068 tons in 22 stacks. Since the same section had 38 furnaces at work, with a weekly capacity of 24,142 gross tons, on June 1, 1893, it has not relatively dropped back as seriously.

Among the coke furnaces which have banked or blown out during September are: Niagara, in New York; Stewart, in the Shenango Valley; Rockbridge, in Virginia; two furnaces of the Illinois Steel Company, at South Chicago, and Phoenix, in the Mahoning Valley. There have been blown in during the same month one Maryland, at Sparrow's Point; one Cambria, at Johnstown; Franklin and Mingo, in Ohio, and Spathite, in Alabama.

The status of the anthracite furnaces was as follows:

Anthracite Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	18	1	559	17	6,094
New Jersey.....	11	2	956	9	3,841
Spiegel.....	3	2	137	1	118
Pennsylvania:					
Lehigh Valley.....	44	11	3,857	33	12,536
Spiegel.....	1	0	0	1	61
Schuylkill Valley.....	27	10	5,148	17	7,210
U. Susquehanna Valley.....	14	2	712	12	4,275
L. Susquehanna Valley.....	17	2	1,652	15	5,490
Lebanon Valley.....	15	4	2,327	11	4,821
Totals.....	150	34	15,338	116	44,910

For a number of months past our records of active anthracite furnaces show the following:

	Furnaces in blast.	Capacity per week.
October 1, 1893.....	34	15,338
September 1.....	43	20,758
August 1.....	51	23,572
July 1.....	63	29,268
June 1.....	70	33,916
May 1.....	67	33,168
April 1.....	72	34,641
March 1.....	74	34,773
February 1.....	74	32,871
January 1.....	70	32,772
December 1, 1892.....	69	33,602
November 1.....	69	30,869
October 1.....	69	29,958
September 1.....	66	27,453
August 1.....	66	28,821
July 1.....	72	31,754
June 1.....	76	33,209
May 1.....	81	35,473
April 1.....	84	36,487
March 1.....	89	38,078
February 1.....	92	38,124
January 1.....	94	38,307
December 1, 1891.....	85	34,905

The number of furnaces at work has been lessened by the stoppage of Anvil and one Brooke in the Schuylkill Valley, one Allentown, two Bethlehem, one Crane and one Thomas in the Lehigh Valley.

Stocks.

The position of stocks, sold and unsold, as reported to us October 1, was as follows, the same furnaces being represented as in former months:

	July 1.	Aug. 1.	Sept. 1.	Oct. 1.
Tons.				
Anthracite pig.....	114,955	111,468	115,930	121,597
Coke pig.....	344,138	420,390	513,260	532,157
Charcoal pig.....	193,629	191,838	197,881	179,908
Totals.....	652,722	723,696	827,071	833,662

The figures represent an increase in the accumulation of coke pig-iron of nearly 19,000 tons during the month of

September. Thus while the amount of stock continues to increase it will be seen that the rate of increase is not merely in proportion to that of the last few months. The gain has been general throughout the coke producing districts of the country with the exception of New York and Tennessee, where a decrease has taken place. The charcoal furnaces report a falling off in stocks of nearly 18,000 tons, while the anthracite producers have slightly increased their holdings.

MANUFACTURING.

Iron and Steel.

Several more sheet mills were put in operation last week at the plant of the Atna-Standard Iron & Steel Company, Bridgeport, Ohio. All the sheet mills formerly included in the Standard plant are running except No. 9. The sheet mills of the Atna works are not yet in operation. The three-high plate mill differences have been settled and it is now running.

At the works of the Whitaker Iron Company, Wheeling, W. Va., four sheet mills are now in operation. Repairs and alterations are being rapidly made on three others and a new mill is being built. This will make eight sheet mills at this company's plant.

All except two puddling furnaces of the Standard plant at Bridgeport, Ohio, now Atna-Standard Iron & Steel Company, have been torn down to make room for other improvements.

At the Top Mill, Wheeling, W. Va., operated by the Wheeling Iron & Steel Company, the 52 inch sheet mill is in operation, also one small sheet mill, each running double turn.

The Bessemer steel plant of the Shenango Valley Steel Company, New Castle, Pa., has commenced operations after a prolonged shut down.

The New Philadelphia Iron & Steel Company, New Philadelphia, Ohio, have given notice of a 10 per cent. reduction in wages. All employees whose earnings are governed by the scale of the Amalgamated Association will be affected.

The hammer house of the W. Dewees Wood Company, McKeesport, Pa., which has been idle for several weeks, has resumed in full. The steel mill has also resumed after a week's shut down, so that almost the entire mill is now in operation.

The Chicago Steel Works, at Chicago Heights, Ill., have been purchased by Youngstown capitalists, who propose to complete the plant and have it in readiness for operation in about 60 days. The works have heretofore made a specialty of agricultural shapes, and they will probably continue in that line.

The Midland Steel Company of Muncie, Ind., enjoy the rare distinction of having been one of the few concerns in the entire country whose operations were uninterrupted by the recent panic. Their works are still running on full time in the manufacture of light and heavy steel sheets. The active demand for black sheets for tinning purposes is causing the company to regard that branch of the sheet business with much interest, and the probabilities are that they will shortly put themselves in a position to secure a share of it. Their equipment for this purpose lacks only the polishing rolls.

Trouble between the Indiana Iron Company of Muncie, Ind., and their old employees, whose faith is strong in union on the old scale of wages, has culminated in the importation of other labor. An impassable fence has been erected around the works, and it is stated that an electric current is passed through the wire that binds the fence boards whenever attempts are made to climb the barrier. This mill is outside the quarantined district.

Following the news contained in an item appearing in *The Iron Age* of last week concerning trouble over a reduction in the wages of wire drawers at the Salem, Ohio, works of the Salem Wire Nail Company, comes word that all employees in this department are discharged, and that they are endeavoring, without apparent success, to interest employees of other departments

with a view of causing a general strike. This company have another large plant at Findlay, Ohio, which they have successfully placed upon a non-union basis.

It has been rumored at Troy, N. Y., that I. Townsend Burden, Chester Griswold and Erastus Corning were to purchase the plant of the Troy Steel & Iron Company and run it. Receiver Kemp says that the syndicate mentioned has not approached him on the subject.

After an idleness of four months the Indiana Iron Company, one of the largest manufacturing concerns of Muncie, Ind., have resumed operation. It is stated that the workmen accepted a reduction in wages of 25 per cent.

On account of the breaking of a large cog wheel, causing a temporary suspension of work, it has been erroneously reported that the Ohio Falls Iron Works, at New Albany, Ind., have been closed down for an indefinite period. As a matter of fact, the works were closed for only one week and are now running to their full capacity. They have been running exclusively on orders for the last three months and have orders on hand sufficient to keep them going for some time to come.

Damage to the extent of \$5000 was done to the works of the Windsor Locks Steel Company, at Windsor Locks, Conn., by the bursting of a 14-foot balance wheel weighing about 15 tons. The wheel was a new one and was being tested. The roof was torn off a portion of the works and a 55-foot smokestack knocked down.

At a recent meeting of the stockholders of the Pennsylvania Steel Company, held in the Philadelphia office of the company, the old Board of Directors was re-elected, and the number increased by the election of Effingham B. Morris, president of the Girard Trust Company, which corporation is one of the receivers of the Pennsylvania Steel Company.

The once great Vulcan Iron Works, at St. Louis, Mo., covering 6 acres of ground, are being sold piecemeal as junk. The 8-ton steam hammer was sold to Pittsburgh parties recently for \$6000. Even the brickwork is disposed of to wreckers.

The court has granted to H. B. Oliver of Pittsburgh, Pa., the right to enter into an agreement with M. A. Hanna & Co. of Cleveland, Ohio, whereby the Oliver Iron & Steel Company and the Cleveland firm above named are to operate the Rosena Furnace, at New Castle, Pa., jointly. The Rosena has been practically rebuilt, and is now said to be one of the most complete and modern furnaces in the Shenango Valley.

The Philadelphia Bridge Works, at Pottstown, Pa., have started up on double turn, contracts having been received to keep them busy for some time.

The Susquehanna Rolling Mill of Columbia, Pa., has resumed work after a stoppage of some weeks.

Dora Furnace, at Pulaski, Va., has recently made some records that are believed by furnacemen to surpass anything in the South. She made during the month of August 4512 tons of iron on a fuel consumption of 2180 pounds of coke per ton of iron, of which 65 per cent. was foundry iron. Her record for the week ending September 23 was 1128 tons for seven days' work. That was made on a fuel consumption of 2000 pounds of coke per ton of iron, grading 93 per cent. foundry iron. Her best day's record was 206 tons.

After a shut down of several months the Old Dominion Nail Works on Belle Isle, at Richmond, Va., have resumed operations. The nail factory will resume during the week, together with the guide and bar mills.

The Carbon Steel Company of Pittsburgh have recently completed the erection of an electric light plant at their works.

Wm. Swindell & Brother, engineers and contractors, of Pittsburgh, have recently received a contract for the erection of a 24-pot crucible melting furnace at the tool steel works of the Collins Steel Company, at Collinsville, Conn. The same firm have also a contract for the erection of two additional Swindell annealing furnaces in the works of the Sterling Steel Company at Demmler, Pa.

A general reduction of wages averaging about 10 per cent. has gone into effect among the employees of Jones & Laughlins, Limited, at Pittsburgh. All classes of labor were affected except those working under

the scales of the Amalgamated Association.

At Pittsburgh last week Charles A. O'Brien, acting for Pennock Brothers of Minerva, Ohio, filed in the United States Circuit Court an application for the appointment of a receiver for the Columbia Iron & Steel Company of Pittsburgh, with works at Uniontown, Pa. With the application is a petition asking that the judgments confessed last week to Robert Hogsett and the People's Bank, at Uniontown, be set aside. It is also charged in the bill that the officers of the firm are dissipating the property.

The Union Rolling Mills of Cleveland, Ohio, resumed operations last week to nearly their full capacity. It is stated that operations were resumed with the understanding that wages to be paid would be governed by those paid in same mills in the Mahoning Valley when operations there have been resumed. The number of heats per day to be made by the puddlers will also be regulated by the practice in the Mahoning Valley. For the present five heats in 12 hours will be the rule.

Employees of the Warren, Ohio, Rolling Mills, operated by the Union Iron & Steel Company of Youngstown, have been notified that their services are no longer required and they are advised to seek positions elsewhere. This mill has been ready to start at a day's notice for several weeks past, but failure to make satisfactory terms with the workmen has caused this action.

The Apollo Iron & Steel Company, at Apollo, Pa., have started up in nearly all departments with non-union workmen.

A press dispatch from Muscatine, Iowa, dated the 7th inst., says that on that day, amid the cheers of 3000 spectators the Williams Rolling Mills steamed up and rolled the first piece of iron. The concern will employ 200 to 300 skilled laborers. It was built by citizens of Muscatine through the Improvement Company.

The puddle mill of the Phoenix Iron Company, Phoenixville, Pa., has resumed operations.

The plate mill of the Ellis & Lessig Iron and Steel Company, at Pottstown, Pa., has resumed operations, the employees agreeing after a conference to accept the reduction until the return of better times. They are to work five days a week and three weeks a month. The puddlers have not yet decided to accept the proposed reduction in their wages.

Another of the furnaces connected with the pipe mill of the Reading Iron Company, Reading, Pa., has resumed operations, giving employment to 75 more hands. It is stated that the prospects for an early resumption of the entire mill are excellent.

The puddling and the steel rail departments of the Bethlehem Iron Works, Bethlehem, Pa., will, it is stated, resume work on Monday next. They have been idle several months. Fifteen hundred men will be given work.

After two months of idleness the rolling mill of the Valentine Iron Company, Bellefonte, Pa., has again been put in operation.

In all probability the Clinton Iron & Steel Company will endeavor to start up their Clinton Rolling Mill on the South Side, Pittsburgh, with non-union men during this week. Although the scale of the Amalgamated Association calls for \$5 per ton for boiling this firm state that they are unable to pay this price and compete with non-union mills in Pittsburgh, where the price is 50 cents per ton and in some cases \$1 per ton less. It is stated that the firm have secured a large force of non-union men, sufficient to start up the puddling department some time during this week.

During this week the Homestead Steel Works, Homestead, Pa., will operate according to this schedule: Armor plate, open hearth, converting mill, 28-inch plate mill and the 10-inch mills will be on double turn. The 23, 32, 35 and 40 inch mills on single turn.

Keystone Furnace, at Chain Dam, Pa., owned by the Thomas Iron Company, was blown out last week.

The Apollo Iron & Steel Company, Pittsburgh, Pa., have withdrawn as members of the Association of Iron and Steel Sheet Manufacturers with headquarters at Pittsburgh. This step was taken for the reason that this firm have decided to employ only non-union labor in the future. When the wage scale governing sheet mills adopted in Pittsburgh in July last was presented to the employees of this firm, some of them re-

fused to be governed by it. In addition to this, when the manufacturers asked that a vote of the lodges of the Amalgamated Association be taken as to whether they would agree to reconsider the wage scale, the request was refused, although it has since been decided to have the different lodges vote on the question. On Monday, the 9th inst., two mills of the above firm at Apollo, Pa., were put in operation, and on the day following another was started up. It is the intention of the firm to operate only such portions of their plant as their trade requires. In the future they will deal with their employees as individuals and no labor organizations of any kind will be recognized.

The Totten & Hogg Iron and Steel Foundry Company, Pittsburgh, Pa., report trade as improving, having recently received a number of orders for rolls and rolling mill machinery. On Monday this firm received an order from one concern for 30 rolls. This would seem to indicate that in some sections, at least, business is improving.

Machinery.

Among orders received by A. L. Ide & Son of Springfield, Ill., during the last ten days are the following: One 100 horse-power Ideal engine for the Ludington Building, second order; one 125 horse power engine for the Hoopeston Canning Company, Hoopeston, Ill.; three 175 horse-power Ideal tandem compound engines for the new Stock Exchange Building, Chicago; two 125 horse-power and one 100 horse-power Ideal engines for the Southern Hotel, St. Louis. The Stock Exchange and the Southern Hotel engines are all to have General Electric Company multipolar armatures directly attached to their crank shafts, the stock exchange engines driving 100 K. W. machines and the Southern Hotel engines driving 50 K. W. machines. The two 125 horse-power engines each drive in addition one 50 arc light dynamo bolted from its governor pulley.

The newly incorporated firm of Harrington, Son & Co., Philadelphia, will erect a large machine plant.

The Lehigh Valley Railroad shops, at Easton, Pa., are now working full handed on full time.

Friskie Elevator & Mfg. Company, New Haven, Conn., have recently put in what is said to be one of the largest electric elevators ever built. It is located in the car house of the Consolidated Street Railway Company, Worcester, Mass., and is used for elevating cars. Its capacity is 9 tons, with platform 34 x 10 feet and 15 feet high.

The W. H. Page Boiler Company of Norwich, Conn., have completed plans for a new foundry, which they propose to build in connection with their present plant, to accommodate increasing business.

The machine shops of the Southern Pacific Railroad Company, which for some time past have been working but four days per week and eight hours a day, are now running on full time with a full force.

The Hay Budden Mfg. Company of Brooklyn, N. Y., have been incorporated to manufacture and sell dies and anvils and carry on a general forging and blacksmithing business. The capital is \$20,000.

The National Iron Works and the Vulcan Brass Works, at Cleveland, Ohio, have been damaged by fire, the former sustaining a loss of \$7000 and the latter \$4500.

John Adt & Son, well-known builders of machinery at New Haven, Conn., are operating their plant with about one-quarter of their usual force, eight hours a day and six days a week. While the tone of business with them has considerably improved during the last month, they do not look forward to any considerable improvement in the situation until Congress takes action on the tariff question.

The Birmingham Iron Foundry, founders and machinists, Birmingham, Conn., continues to run six days a week, with nearly a full complement of hands. The company are troubled with slow collections, but otherwise the outlook with them is quite satisfactory under the circumstances.

Thurman & Powell, machinists and foundrymen of Louisville, Ky., have assigned. The assets are \$36,468.29, and the liabilities \$31,401.49.

The Swamscot Machine Company of South Newmarket, N. H., doing business in Boston under the firm name of George K. Paul & Co., have assigned. It is hoped to pay creditors in full, and to continue the plant in operation, which gives employment to practically the whole town of South

Newmarket. The company's assets consist of bills receivable and cash amounting to \$81,500; real estate, tools, machinery, &c., \$110,000; stock in trade in store in Boston, \$66,000. The debts amount to \$140,000. The directors' object is to realize the best possible price on the stock in the store in Boston, pay up the debts and thus free the corporation at South Newmarket.

The Finance Committee of Montreal, Canada, have recommended to the Council the purchase of a Worthington high duty pumping engine having a capacity of 12,000,000 United States, or 10,000,000 Imperial gallons of water per 24 hours. The Worthington Company offer to deliver and install within 60 days from the closing of the World's Columbian Exposition the pumping engine now on exhibition at the fair for the sum of \$55,000. The engine in question is of the same type and capacity as the one already in operation at Montreal, so that the water capacity of that city will be doubled.

The Christopher Double Power Rotary Engine Company have been incorporated at Spartansburg, S. C., by C. E. Christopher, S. Wilson and associates, with a capital stock of \$1,000,000, to establish engine works.

The Robingson Mfg. Company, operating a brass foundry at Beaver Falls, Pa., have not gone into a receiver's hands, as stated in recent press dispatches. The report grew out of the fact that a receiver has been appointed for the concern owning the building in which the company carry on their business.

The Kitson Machine Company of Lowell, Mass., have laid off 26 of their employees owing to dull business.

The American Road Machine Works of Kennett Square, Pa., have closed for an indefinite period, throwing out of employment about 200 men. This is the first time in years that the works have been forced to close on account of a lack of orders.

The Northwestern Malleable Iron Works, at Milwaukee, Wis., which closed down about two months ago on account of lack of orders, have resumed with a full force. It is understood that the works have a number of good sized orders on hand.

Hardware.

The cutlery of the Humason & Beckley Mfg. Company, New Britain, Conn., have resumed work.

The nailers and the Laughlin Nail Company, Martin's Ferry, Ohio, have come to an agreement, the former accepting the 15 per cent. reduction in wages proposed by the company. The works are again in operation, giving employment to nearly 700 hands.

The implement works of the Parlin & Orendorff Company, Canton, Ill., have resumed work with 800 employees.

The Parker Mills Nail Works, Wareham, Mass., which have been idle for six weeks, have started up.

The Eaton-Ritchell Company, manufacturers of tinware, Denver, Col., have decided to remove to South Omaha, Neb., and will commence the erection of a plant at that point at once. The building will be 60 x 190 feet and will cost about \$6000. The firm will give employment to 50 men.

The American Wringer Company's plant at Woonsocket, R. I., which has been running three days a week during the past two months, will probably start in on full time in a few days.

G. W. Denison & Co., Winthrop, Conn., manufacturers of wood planes, are closing out their business.

The Hatch Cutlery Company, South Milwaukee, Wis., and 97 Chambers street, New York, are congratulating themselves on the amount of Christy knives sold since they undertook to market the entire output in July last. They refer to the aggregate number of sets disposed of since that time as 10,000, and assure us they are making an effort to execute orders promptly.

The new nail factory of the Hollis Tack & Nail Factory, at Scottdale, Pa., was put in operation on September 15, giving employment to about 25 men and boys. The factory is equipped with 30 tack and nail machines, 20 of them being in operation. The firm expect to start up the balance about November 1 next. The concern advise us that they are meeting with a good demand for their nails, and expect to secure a fair share of the trade. The concern have a capital stock of \$20,000, with officials as follows: W. A. Kifer, president; F. M. Branthoover, secretary, and John Robertson, treasurer.

TRADE REPORT

The terrific struggle for work continues, and on large orders accompanied by satisfactory terms of payment unprecedented prices are made. The sacrifice of all profits along the whole line, the low cost of raw materials and the reductions in labor have brought down the theoretical cost of manufacture to figures hitherto undreamt of in this country. We say advisedly "theoretical," because it is dependent upon full employment. To reach the condition begotten by a fairly well filled order book is what so many are striving for. Spot cash, too, fetches very low figures. In fact, the terms are so potent a factor now that reports as to prices accepted for prompt settlement are no criterion as to what could be done on transactions on the ordinary basis. This fact must be kept in mind steadily.

If the Rockefeller interest can buy 300,000 tons of Mesaba Ore, delivered at lower Lake ports, at \$2.75, cash, it does not follow that contracts can be placed at that figure at other terms. Although a Cleveland mill did buy 12,000 tons of Steel Billets for \$17.50, cash, on cars Pittsburgh, a small consumer cannot do better than \$18.25, ordinary terms. Coke at \$1 3/4 ton at Connellsville, even, might possibly be done under special circumstances, but the open quotation is \$1.10. In the same way special prices are being made for Finished Material, as in the case mentioned by our Philadelphia correspondent. But the circumstances surrounding the transactions are such that very few can avail themselves of them, however much many might be willing to do so.

Our monthly Pig Iron statistics reflect as closely as it is possible for any one article in the line of Iron products to do so the volume of current consumption. They show that we are still accumulating a little metal in spite of the fact that current production is only 43 per cent. of the normal output of say 9,000,000 tons per annum.

Bessemer Pig is down to \$11.50 in Pittsburgh, and even \$11.25 has been done under special circumstances. Costs have changed so much lately that manufacturers are quite at sea concerning the capacity of rivals to live at low figures. There is a good deal of discussion going on whether \$6, \$6.50, or \$7, or \$7.50 are a fair representation of cost of converting Pig Iron into Steel Billets. Some very emphatic statements are made concerning the claims of those who assert that the lower figures represent actual practice. In a similar way the controversy is raging over the cost of rolling Billets into Rods, and over other similarly perplexing questions.

In a general way the conclusion is warranted that very few of the works throughout the country can touch the costs proclaimed by some, and that therefore any inferences based upon them as to the permanency of present values are dangerously unsafe to the buyer. That lasting reductions in the cost of producing Iron and Steel have been made no one will deny, but neither labor nor capital can long suffer as they are now doing. The present range of values is abnormal and cannot last long. Even now far more than half of the aggregate manufacturing capacity is helplessly out of the race. When consumers need their product they will have to accord prices which will pay them to start.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street. CHICAGO, October 11, 1898.

Pig Iron.—The past week has been quiet, with not even a rumor of a large sale. Inquiries have fallen off. The few transactions reported in Coke Iron are principally in Southern brands. Southern manufacturers are, however, quite stubborn about long deliveries, and claim that they will sell only at present rates up to the first of the year. For delivery beyond that time they ask more money. The situation is regarded by prominent dealers as one of waiting on the part of buyers. They believe that nothing favorable or unfavorable can be based on present conditions. Consumers are wholly at sea regarding the future, and not knowing what to do they naturally do nothing. If the Senate soon settles the silver question by the passage of the repeal bill it is expected that there will be some resumption of activity. Meanwhile everything hesitates. Quotations are now as follows for cash:

Lake Superior Charcoal.....	\$16.00 @	\$16.50
Local Coke Foundry, No. 1.....	13.50 @	14.00
Local Coke Foundry, No. 2.....	12.75 @	13.00
Local Coke Foundry, No. 3.....	12.50 @	12.75
Local Scotch.....	14.00 @	14.50
Ohio Strong Softeners No. 1.....	15.50 @	16.00
Southern Silvery, No. 1.....	11.00 @	14.00
Southern Silvery, No. 2.....	12.35 @	12.60
Southern Coke, No. 2.....	11.00 @	11.85
Southern Coke, No. 3.....	12.35 @	12.60
Southern, No. 1, Soft.....	11.85 @	12.10
Southern, No. 2, Soft.....	11.10 @	11.85
Southern Gray Forge.....	16.00 @	16.50
Tennessee Charcoal, No. 1.....	18.50 @	18.75
Alabama Car Wheel.....	15.25 @	16.00
Hocking Valley, No. 1.....	16.00 @	17.00
Jackson County Silvery.....		

Bars.—Transactions recently have been confined to small quantities of Bar Iron and Soft Steel Bars. The volume of business is, however, a little larger than for some time past, as shown by the ability of local mills to continue in operation. Prices of Bar Iron range from 1.40¢ to 1.45¢, half extras, Chicago delivery. Soft Steel Bars are generally quoted at 1.55¢, Chicago, but good specifications can be placed at a little lower figure. Store prices are unchanged at 1.65¢ @ 1.70¢ for Bar Iron and 1.70¢ @ 1.75¢ for Soft Steel Bars.

Structural Material.—Only sales of small lots are reported. Quotations are maintained at the following prices on mill shipments, Chicago delivery: Beams, 1.75¢ @ 1.90¢; Tees, 1.95¢ @ 2.05¢; Angles and Universal Plates, 1.75¢ @ 1.80¢.

Plates.—Nothing new is to be noted under this head. Only a moderate business is in progress in mill shipments, while store trade is about as reported last week. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.75¢ @ 1.80¢; Shell Steel, 2¢ @ 2.10¢; Flange Steel, 2.15¢ @ 2.30¢; Fire Box, 2.75¢ @ 5¢. Store prices now prevail as follows: Iron or Steel Sheets, Nos. 10 to 14, 2.25¢ @ 2.40¢; Tank Steel, 2.10¢ @ 2.20¢; Shell Steel, 2 20¢ @ 2.40¢; Flange Steel, 2.50¢ @ 2.65¢; Boiler Tubes, 67½¢.

Sheets.—The mills manufacturing Black and Galvanized Iron are now a little firmer in their views. This is perhaps owing to the fact that orders are being concentrated with the mills now running. Quite a number of contracts have been canceled with idle mills and replaced with those able to make prompt shipments. The minimum price of mill shipments now seems to be 2 80¢, Chicago, for No. 27 Common Black Sheets and 75 ¢ for Juniata Galvanized, with

freight added. Small lots from stock are selling at 2.90¢ @ 3¢ for Common No. 27 Sheets and 70% @ 70 and 7½% off for Galvanized Iron. Sheet Copper continues to be quoted at 30% @ 35% off, according to quantity.

Merchant Steel.—Specifications are coming in more freely on season contracts. Orders for prompt shipment, although small, are also better than they have been. General consumers are buying better, showing that their stocks are running out and must be replenished. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery, Tire and Open Hearth Spring Steel at 1.90¢ @ 2¢; Ordinary Bessemer Machinery, 1.60¢ @ 1.65¢; Ordinary Bessemer Tire, 1.55¢ @ 1.60¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Rails and Track Supplies.—The Steel Rail situation is unchanged, business being light on standard sections, but moderately active on Light Rails. Standard sizes are unchanged at \$30 @ \$32; and Light Rails \$31.50 @ \$32. Iron and Steel Splice Bars 1.60¢ @ 1.65¢; Track Bolts with Hexagon Nuts, 2.50¢ @ 2.55¢; Spikes, 1.85¢ @ 1.90¢.

Old Rails and Car Wheels.—Offers are made of \$14.50 @ \$15 for Old Iron Rails, but the railroads ask \$16 and more, so that no trade has resulted. Old Steel Rails are quoted at \$8 @ \$10, according to length. Old Car Wheels are in no demand, and it is difficult to determine values. Large lots would be taken by some buyers at \$10 @ \$10.20, who deem Old Wheels at such prices a good speculation. Single carload lots command \$13.50 @ \$14.

Scrap.—Inquiries are coming in from distant points, but buyers appear to be unwilling to pay Chicago prices. The local demand is light. The demoralization of prices is shown by the amount realized on a carload of low grade Scrap sold under some pressure last week. It netted the seller only 64¢ per ton. Dealers' selling prices, net ton, are as follows: No. 1 Forge, \$10; No. 1 Mill, \$8; Sheet Iron, \$5; Pipes and Flues, \$7.50; Axles, \$15; Horseshoes, \$10; Fish Plates, \$12.75; Spikes and Bolts, \$10; Cast Borings, \$5; Wrought Turnings, \$6.50; Axle Turnings, \$8; Heavy Cast, \$9; Stove Plate, \$7.75; Malleable Cast, \$8; Mixed Steel, \$9, gross ton; Leaf Steel, \$16.

Metals.—Carload lots of Lake Copper are quoted at 10½¢. Casting brands are still held at 9½¢, but trade continues dull. Spelter is lower. It has sold at 3.55¢, but can possibly be bought now a trifle below that. Lead has fallen to 3.45¢ in carload lots. Some sellers have endeavored to force their holdings on the market, while buyers are not disposed to take much at present.

George G. Spencer, 553 The Rookery, Chicago, has been given entire charge of the sales department of the Cambridge Iron & Steel Company, Cambridge, Ohio. The company manufacture light Iron and Steel Sheets exclusively. They have recently added a galvanizing department, and manufacture Galvanized Sheets under two brands, Cambridge and Cambridge Best. Mr. Spencer has had much experience in the Sheet trade, having represented the Etna Iron & Steel Company for eight years, during which time he built up a large business in that line. In addition to the management of the sales department of the Cambridge Company, Mr. Spencer will continue his connections in other branches of trade.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., October 10, 1893.

The condition of the market is much the same as last week, although there is a more hopeful feeling and a disposition to act on the idea that things are going to be better. Prices are extremely low, and with but few exceptions are lower than they were a week ago, although this is measurably offset by cheaper cost, so that averaging it all around the trade are inclined to accept the situation as giving promise of improvement, especially as there is a better demand and a better outlook generally. Inquiries are more numerous and money is easier, and with a continuance of favorable conditions during the next two or three weeks business ought to resume some of its old time activity. Until that time it is hardly to be supposed that prices will show much change, although they must be pretty well down to bed rock. A few large orders have been taken for Pig Iron, and some good sized lots of Finished Material have also been placed; but nothing encouraging can be said in regard to the prices that were realized. This, indeed, is the most unsatisfactory feature of the market, but for the time being competition is so sharp that anything out of the ordinary run of business is jumped for almost without regard to prices.

Pig Iron.—This end of the market is about as dull and uninteresting as it possibly can be. Buyers appear to be utterly indifferent to low prices; if they need iron they will order just a little; if they do not need it, price is no inducement. Sales therefore are to a great extent carload lots, 50 tons or 100 tons, and occasionally it may be a 200 or 300 ton lot at quoted rates, but on a larger lot special terms must be arranged, either by a concession in price, time for delivery, or in terms of payment. The fact is, buyers have everything their own way, and while there is no undue pressure to sell, all that a buyer needs to do is to signify that he wants iron, and the supply of all kinds and from all quarters is immediately seen to be abundant. All the same, it is a frequent remark that some of these days—and perhaps very soon, too—there will be a change of tone, but in the meanwhile it is equally true that there is no disposition to anticipate such a contingency, which, however, only serves to make it more of a probability. Sales are usually within the following range of prices, varying according to quantity, brand, delivery, terms of payment, &c.: \$12.25 @ \$12.75, delivered, for Gray Forge or Plain No. 2; \$13.75 @ \$14 for No. 2x; \$14.25 @ \$14.50 for No. 1x.

Steel Billets.—Business is not large, although prices are again lower, \$20.75, with a chance that \$20.50 or less would be accepted on a firm offer for a round lot, quick delivery and prompt cash settlements. A few small lots have been taken at \$21 @ \$21.25, but there is not much disposition to do business, although one or two lots of importance are under negotiation and will probably be closed in a day or two at something less than \$20.75.

Finished Material.—A more active demand is reported, and of a pretty well distributed character, but with so many mills looking for work, inquiries are in many cases little more than an incentive for manufacturers to name lower prices than ever. The past week has

probably seen the lowest figures yet reached, but at this writing there would be no difficulty in duplicating any purchase recently made. Ordinarily prices on small lots are not greatly changed from last week, but on 50-ton orders, or from that up, extraordinarily low figures are named, figures which can hardly be given in print without leading to misapprehension among the smaller-class of buyers. The reason given for such tremendous cuts in prices is that the large mills are determined to get all the work possible, so that when the order is large enough to make it worth while, prices are slaughtered most unmercifully. The 3000-ton order taken by the Phoenix Bridge Company last week is a case in point, Pittsburgh furnishing the plates, the Phoenix Iron Company the balance of the material. There are other orders of this class likely to be around soon, particularly for architectural work and shipbuilding, but at best there is not likely to be more than sufficient to maintain the *status quo*. Still it is something to feel that matters are not likely to be worse, with some chance for a moderate improvement. General quotations are about as follows, with the usual concessions on large lots:

Grooved Skelp, delivered.....	1.50¢	@	1.55¢
Best Refined Bars.....	1.55¢	@	1.60¢
At interior points.....	1.50¢	@	1.55¢
Tank Steel.....	1.60¢	@	1.65¢
Heavy Plates.....	1.65¢	@	1.70¢
Shell.....	1.75¢	@	1.85¢
Flange.....	2.00¢	@	2.20¢

Old Material.—There is very little disposition to buy, so that prices vary according to the desire of the holder to realize. As a rule asking prices are about as follows:

No. 1 Wrought Scrap, delivered.....	\$12.50	@	\$13.50
Machinery Cast, delivered.....	10.50	@	11.00
Heavy Steel Scrap, delivered.....	13.00	@	14.00
Old Iron Rails, delivered.....	15.00	@	16.00
Old Street Rails, delivered.....	17.00	@	18.00
Wrought Turnings, delivered.....	10.00	@	11.00
Cast Borings, delivered.....	6.50	@	7.00
No. 2 Light Scrap, new.....	8.00	@	8.50
No. 2 Light Scrap, old.....	6.00	@	7.00

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts., CINCINNATI, October 11, 1893.

The market has been unusually dull for Pig Iron during the past week, even for these dull times. There has been about the usual current consumptive demand in this district for car lots, but they seldom run above 200 tons each; and even the orders from the East have been for reduced quantities, and notwithstanding the comparatively light offerings of Southern Iron there is an ample supply for the wants of the trade. The stove works in this district are buying generally in a small way, and while prices as a rule are sustained there have been concessions made in some instances. 1000 tons Gray Forge was sold on competitive bids which resulted in the price being made of \$6.75 per ton, f.o.b. Birmingham, for deliveries running up to March, and while this is considered exceptional it indicates that there are still sellers to be found at low prices. The current demand is mainly for No. 2 Foundry and No. 1 Soft, and for these pretty full quotations are realized. There appears to be no movement in Charcoal Iron. Collections are not improving much, if any; better things are

expected when the Silver Purchase bill is repealed. Quotations are as follows:

Foundry.

Southern Coke, No. 1.....	\$12.75 @ \$13.00
Southern Coke No. 2.....	10.75 @ 11.00
Southern Coke No. 3.....	10.25 @ 10.50
Ohio Soft Stone Coal, No. 1.....	15.50 @ 16.00
Ohio Soft Stone Coal, No. 2.....	14.50 @ 14.75
Lake Superior Coke No. 1.....	15.00 @ 15.25
Lake Superior Coke No. 2.....	14.00 @ 14.25
Hanging Rock Charcoal, No. 1.....	18.50 @ 19.00
Hanging Rock Charcoal, No. 2.....	17.50 @ 18.00
Tennessee Charcoal, No. 1.....	14.00 @ 14.25
Tennessee Charcoal, No. 2.....	13.00 @ 13.25

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	17.75 @ 18.00
Lake Superior Car Wheel and Malleable.....	17.00 @ 17.25

Forge.

Gray Forge.....	9.75 @ 10.00
Mottled Coke.....	9.50 @ 9.75

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, Pittsburgh, October 10, 1893.

As the end of the year approaches the conviction becomes general that no permanent improvement in the Iron and Steel trades can be reasonably expected before next year. While prices on all kinds of material are much lower than ever before, business is confined to sales for immediate requirements, and when a large order is placed, it is for the reason that the buyer is offered an exceptionally low price, at which he feels he can afford to take the risk of further decline in the market before he is ready to enter it again. Going right through the list of Iron and Steel manufactures it would seem that prices cannot reasonably go any lower, and yet, when an attractive order is presented there is such a scramble for it that values are sent a peg lower, and it is a wise man, indeed, who can state at which point the line will be reached and the downward tendency checked. During the past three months Pittsburgh has set the pace in offering attractive prices, and makers both East and West have been compelled to drop out. However, when prices at which certain contracts have been taken are considered, it is evident at once that cost mark has been reached and gone under in many instances. The determination of large concerns to get enough business to keep in operation is, of course, responsible for this state of affairs. For the week under review prices have shown a further decline in some lines. Bessemer Pig has touched \$11.50, Pittsburgh, while \$18 on Billets, which was an inside price at our last report, has been materially shaded in a large block for balance of the year's delivery. Coke is freely offered at \$1.10 in Connellsville region, and the days of dollar Coke are not far off, if they are not already here.

Pig Iron.—The market is about as dull as it is possible for it to get, and with more Iron being made than is being used there does not seem to be any hope of improvement for some time. At furnaces in the Pittsburgh district, and in the valleys as well, large stocks of Iron are piled up, and these are being depleted very slowly, owing to the light demand. At no time in the Iron business have makers been able to turn out product as cheaply as at the present time, but in spite of this it is somewhat doubtful if Bessemer Iron can be made at a cost of \$11.25 per ton at furnace, at which price a transaction is reported to have been made last week. For ordinary lots ranging from 100 to 500 tons the following figures prevail, but on good

sized blocks, with favorable time of payment, it is altogether probable that concessions would be offered. We quote as follows:

Neutral Gray Forge.....	\$10.75 @ \$11.00, cash
All-Ore Mill.....	11.00 @ 11.25 "
Bessemer Pig.....	11.50 @ 11.75 "
No. 1 Foundry.....	12.75 @ 14.00 "
No. 2 Foundry.....	11.75 @ 12.00 "
Charcoal Foundry No. 1.....	14.00 @ 15.00 "
Charcoal Foundry No. 2.....	13.00 @ 14.00 "

We note a sale of 500 tons of All-Ore Mill Iron for October delivery at \$11, Pittsburgh; also a sale of 2000 tons of Bessemer, for October and November delivery, at a price equal to \$11.60, Pittsburgh.

Billets.—Within the past week Steel has been sold at \$18.25 at maker's mill, and it would no doubt require a very desirable order to shade \$18 at mill. As to whether the price referred to above would be duplicated for a similar order is also uncertain. For ordinary business the market is represented by the quotation of \$18 @ \$18.25 at maker's mill.

Muck Iron.—There is very little demand and offers to sell on the basis of \$20.50 at buyer's mill have been declined. However, it is believed that it would require a very desirable order to shade this price.

Wire Rods.—Rod mills for October are pretty well fixed for business, and for delivery this month Rods are held at about \$27.50 at maker's mill. For delivery in November and December \$26 at maker's mill has been asked.

Ferromanganese.—We make nominal quotation of \$55 @ \$56 at maker's mill for domestic. We have not been advised of any sales for some time.

Finished Material.—New business being offered continues small, and the outlook for improvement is not bright. Pittsburgh is credited with taking an Eastern order for Flange Steel at a price considerably lower than has yet been touched. There is a fair inquiry for Beams in small lots, but no large orders have been placed for some time. For ordinary lots prices quoted last week continue to rule, but, as stated before, for desirable business our lowest quotations continue to be shaded to a considerable extent. We quote as follows: Beams up to 15-inch, 1.60¢ at maker's mill; Angles and Universal Plates, 1.60¢ @ 1.65¢; Tees, 1.65¢; Tank, 1.55¢ @ 1.65¢; Flange, 1.80¢ @ 1.90¢; Shell, 1.65¢ @ 1.75¢; Fire Box, 2.50¢ @ 5¢, according to quality; Machinery Straightened Tire Steel, 1.75¢ @ 1.85¢; Toe Calk, 2¢ @ 2.10¢; Open Hearth Spring, 1.90¢ @ 2¢; Bessemer Machinery, 1.75¢; Steel Bars, 1.35¢ @ 1.40¢ at mill, with Bar Iron extras. Bars in the Mahoning Valley are held at 1.35¢ @ 1.40¢, half extras, according to order. Sheets are ruling as follows: Soft Steel Sheets, No. 24, 2.45¢; No. 26, 2.55¢, and No. 27, 2.65¢.

Barb Wire.—The demand continues light, and this, in connection with the decline in Steel and the desire of the makers to push sales, has weakened prices to some extent. We quote Four Point Galvanized at \$2.25 at maker's mill in carload lots, while jobbers are charging \$2.35 @ \$2.40 for lesser quantities. Painted we quote at 40¢ less than above prices. Plain Wire is also quiet, and we quote at \$1.50 at mill for fair sized orders.

Wire and Cut Nails.—Both Wire and Cut Nails are in better demand, and mills are fairly busy. The outlook for the future is bright, as it is claimed that

never before in the history of the trade have stocks been as low as now. We quote Wire Nails at \$1.25 @ \$1.30 for carload lots, while jobbers are getting \$1.35 @ \$1.40 from the smaller trade. We quote Cut Nails at \$1 for carload lots at mill. For an order with good average this price would probably be slightly shaded.

Coke.—Prices of Connellsville Furnace Coke have further weakened and it is now being offered at \$1.10 at ovens. For the week ending Saturday, September 30, there were 5397 ovens in blast and 11,993 idle, with a total estimated production of 48,060 tons. We quote Furnace Coke at \$1.10 in tons of 2000 lb, f.o.b. cars in Connellsville region. Foundry Coke we quote at \$1.50 to dealers and \$1.65 to consumers.

St. Louis.

(By Telegraph.)

Office of *The Iron Age*, Bank of Commerce Building, St. Louis, October 11, 1893.

Pig Iron.—A report of the Iron market for the past week is necessarily a repetition of the week preceding. Sales are limited to carload quantities, and prices, while unchanged, are inclined to weakness. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$13.25 @ \$13.50
Southern Coke, No. 2 Foundry.....	11.75 @ 12.00
Southern Coke, No. 3 Foundry.....	11.00 @ 11.20
Southern Gray Forge.....	10.50 @ 10.75
Southern Car Wheel.....	17.50 @ 18.00
Lake Superior Car Wheel.....	16.75 @ 17.25
Ohio Softeners.....	16.00 @ 16.50
Missouri Charcoal, No. 1 Foundry.....	13.00 @ 13.50

Bar Iron.—The demand fails to show any material improvement and is largely spasmodic in its character. Jobbers are also feeling the dullness. Mills quote 1.50¢, half extras, f.o.b. cars East St. Louis. Jobbers ask 1.65¢ @ 1.70¢ for lots from store.

Barb Wire.—Mills are running full and report a steady trade. Jobbers are also in receipt of some good sized orders. Mills quote \$2 for carload lots of Painted to jobbers, and Galvanized at \$2.40. Jobbers ask \$2.10 @ \$2.15 for Painted, and Galvanized at the usual advance.

Wire Nails.—There is an increased inquiry for Wire Nails, and both mills and jobbers are having a good run of trade. Prices seem to be a trifle heavy and, while not quotably lower, are not held quite so firm as last reported. Mills quote \$1.55 in carload lots to jobbers, and store price is \$1.60 @ \$1.65.

Rails and Track Supplies.—A slight improvement is noticeable in Track Supplies. Splice Bars are quoted 1.65¢ @ 1.70¢; Spikes, 1.95¢ @ \$2; Bolts, Square Nuts, 2.50¢; with Hexagon Nuts, 2.60¢. Steel Rails are nominally \$30 @ \$31. Old Iron Rails are quoted at \$15, a 100-ton lot changing hands yesterday at that price.

Pig Lead.—Continued weakness is noted in this metal, which is now quoted at 3 35¢, with moderate offerings and practically no sales.

Spelter.—There are no buyers in the market and Spelter is nominally quoted at 3.40¢. The consumptive demand has dwindled down to almost nothing, and with the exception of an occasional carload business is practically dead.

Metal Market.

Copper.—There has been freer offering of Lake Superior Ingot by some of the smaller producers and by dealers, the outcome of which is reflected in a decline to $9\frac{1}{2}\phi$ as common selling price. Some of the larger producers claim to be sold ahead, and therefore place their quotations at $9\frac{1}{2}\phi$ @ 10ϕ , but it is an open secret that at least 250,000 pounds have been sold at $9\frac{1}{2}\phi$, regular terms, and that offers were made openly at 9.70ϕ on the Metal Exchange for deliveries running through the balance of the year. The cheaper varieties have fared no better. Electrolytic may easily be secured at $9\frac{3}{4}\phi$ @ $9\frac{1}{2}\phi$, and sales of common casting stock at above $9\frac{1}{2}\phi$ are the exception at present. In fact, it is intimated that those figures have been shaded, and that the general market is weaker below than above the surface, despite quite free movement of stock from this to European points of late.

Pig Tin.—There has been a reverse movement in the price of this metal, the outcome of pressure by operators who have latterly figured with more or less prominence as "bears" in the speculative line and lack of support from the opposing interest. Comparatively little Tin has changed hands in a speculative way, however, except perhaps on old contracts, but the movement of stock into the channels of consumption has continued nearly up to the average for the season and the statistical position is stronger, if anything, at the present time, than it was prior to the reaction. However, the "bear" interest forced a decline of about 0.35ϕ @ 0.40ϕ in prices, carrying Straits to 20.65ϕ , regular terms, and 20.50ϕ for immediate cash payment. At the close of the week under review the market was a trifle firmer, with 20.70ϕ bid for current month delivery.

Pig Lead.—Prices have undergone a sharp decline, and the market at this writing is in somewhat unsettled condition. Common Western Lead has been sold at from 3.70ϕ down to 3.50ϕ . Between that range about 500 tons changed hands. Forced realization on speculative holdings is partly accountable for the decline, but there was some evidence of artificial pressure by a few local operators. At the close the market was about 3.45ϕ bid, 3.55ϕ asked.

Spelter.—The market has been unsettled and irregular, with comparatively little business in this quarter and no sign of livelier demand from dealers or consumers at the decline. Ordinary Western brands have been secured at 3.65ϕ @ 3.70ϕ , and the latter is at present a common selling price. Special brands bring about the usual premium.

Antimony.—About the ordinary business has been effected and prices remain practically unchanged. We quote at $9\frac{1}{2}\phi$ @ $9\frac{3}{4}\phi$ for Hallett's, 10ϕ @ $10\frac{1}{2}\phi$ for L. X., and $10\frac{1}{2}\phi$ @ $10\frac{3}{4}\phi$ for Cookson's, in round lots.

Tin Plates.—A good business has been done in ordinary Cokes for prompt delivery. Somewhat livelier interest in future deliveries has also been manifested. Otherwise the market has shown little spirit, and prices remain without radical change. Spot quotations are as follows: Coke Tins—Penlan grade, IC, 14×20 , $\$5.30$; J. B. grade, do., $\$5.45$ @ $\$5.50$; Bessemer full weight, $\$5.40$; light weights, $\$4.95$ @ $\$5$ for 100 lb., $\$4.85$ @ $\$4.90$ for 95 lb., $\$4.70$ @

$\$4.75$ for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, $\$5.60$; Siemens Steel, IC basis, $\$5.65$; IX basis, $\$6.75$ @ $\$7$. Charcoals—Melyn grade, IC, $\$6.35$ @ $\$6.37\frac{1}{2}$; Crosses, $\$8$; Allaway grade, IC, $\$5.60$; Crosses, $\$6.75$; Grange grade, IC, $\$5.75$; Crosses, $\$6.85$. Charcoal Ternes—Worcester, 14×20 , scarce; do., 20×28 , $\$11.35$; M. F., 14×20 , $\$7.50$; do., 20×28 , $\$15$; Dean grade, 14×20 , $\$5.30$ @ $\$5.37\frac{1}{2}$; do., 20×28 , $\$10.50$ @ $\$10.60$; D. R. D. grade, 14×20 , $\$5.15$; do., 20×28 , $\$10.10$; Alyn, 14×20 , $\$5.32\frac{1}{2}$ @ $\$5.35$; do., 20×28 , $\$10.40$; Wasters—S. T. P. grade, 14×20 , $\$4.75$; do., 20×28 , $\$8.90$; Abercarne grade, 14×20 , $\$4.60$; do., 20×28 , $\$8.80$.

Financial.

Nothing has occurred during the past week to produce any sensible improvement in the general business situation. The condition of things has changed little or not at all from that recorded in our last report. The Fabian policy of delay still prevails in the Senate, and although rumors of more decided action by the repeal majority in that body prevailed toward the close of last week, imparting a rather more hopeful tone to Wall street, no indication has yet appeared of any really effective means being adopted to that end. Meanwhile it is becoming plainer every day that until the present suspense is ended there can be no general and permanent revival of business.

Rumors of compromise by the Senatorial advocates of repeal are still persistently floated, and though probably without any basis, these rumors have a considerable effect in repressing confidence at home in the ultimate triumph of the repeal bill. They have, moreover, a disturbing effect on American credit in Europe. In view of the fact that the balance now outstanding of temporary loans made by foreign bankers during the late stringency, amounting, it is estimated, to over $\$20,000,000$, will fall due at latest before the end of next month, it becomes a question of importance how this indebtedness is to be liquidated should the present unsatisfactory conditions be prolonged to that time. In addition to this contingency, European investors may be expected to retire much of their capital invested in this country, and to return their American securities in large amounts. These considerations do not offer a cheerful prospect for the monetary situation of the near future should the delay and uncertainty now existing be much further protracted.

The accumulation of money at this and other financial centers is, meanwhile, progressing rapidly, and this circumstance, in conjunction with an extensive retirement of Clearing House loan certificates, has caused considerable easiness in the money market. Last Saturday's weekly statement of the New York Associated Banks showed an increase in deposits of nearly $\$9,250,000$ and in loans of $\$847,400$. In cash the banks gained over $\$6,750,000$ during the week, bringing the surplus in reserves up to over $\$28,500,000$. The banks are, consequently, in a good position to extend ample accommodation to the commercial community, but they are not anxious to do much in this line while the outcome of silver legislation is still in the balance. A larger movement of currency to the South has been noted during the week, counterbalanc-

ing to some extent the movement of currency to New York.

The week has seen a further large contraction in the amount of outstanding Clearing House loan certificates. New York banks are retiring theirs at the rate of nearly $\$1,000,000$ a day, and they are rapidly melting away. The amount of such certificates now outstanding here has shrunk to $\$13,210,000$ from a maximum issue of $\$38,280,000$; while Boston has reduced hers to $\$425,000$ from a maximum issue of $\$11,045,000$ a month ago.

Money on call continues in abundant supply, and offerings from banks and trust companies are large. Rates have been quoted as low as $1\frac{1}{2}\%$ and up to $3\frac{1}{2}\%$ since last Thursday. The last loans reported ruled at 2% @ $2\frac{1}{2}\%$, with renewals generally at $2\frac{1}{2}\%$ @ 3% . Owing to the dullness in stocks comparatively little business is doing, however, in the loan market. Time money is inactive, rates being quoted at 4% for 60 days and 5% for four months on mixed collateral, with but little demand for this accommodation. Commercial paper is quiet, and purchases are mainly confined to interior banks. Choice indorsed receivables are quoted at $6\frac{1}{2}\%$ @ $7\frac{1}{2}\%$, and other receivables and single names $7\frac{1}{2}\%$ @ 10% . There is a good assortment of names in the market.

Foreign exchange up to the beginning of the current week showed a marked tendency to lower rates, with a good supply of commercial bills offering in consequence of increased exports of cotton. On Tuesday, however, the market for sterling stiffened, cotton bills having been absorbed and importers buying freely. Rates were consequently advanced; actual business being done at the close on the following basis: 60 days, 4.83 @ $4.83\frac{1}{2}$; demand, 4.85 ; cables $4.85\frac{1}{2}$ @ $4.85\frac{1}{2}$; commercial, $4.81\frac{1}{2}$ @ 4.82 . Domestic exchange on New York is quoted as follows: New Orleans, commercial 150 discount, bank par; Charleston, buying $\frac{1}{2}$ @ $\frac{1}{2}$ discount, selling par @ $\frac{1}{2}$ discount; San Francisco, sight 20, telegraph 30 premium; Savannah, buying $\frac{1}{2}$ discount, selling $\frac{1}{2}$ discount @ par; Chicago, par; St. Louis, 90 premium; Boston, 17ϕ @ $12\frac{1}{2}\phi$ discount.

Operations on the Stock Exchange made an unusually small showing up to the beginning of this week. Interest in the international yacht race, and a legal holiday in Chicago on Monday, interfered with business on more than one day. The general tone of the market for securities has been unsettled and feverish. Although Wall street still takes a hopeful view of the outcome of the repeal struggle, the moral influence of continued delay has been marked in the transactions in stocks of late. The principal feature of Friday's speculation was an extraordinary advance of 10 points in Lackawannas, which also exerted a favorable influence on the other "coalers." Reading advanced on the payment of the October interest on some of its bonds, and an assurance that foreclosure would not be resorted to. Industrials were active and strong on Monday in a generally dull market, and material advances were made on small sales of several securities. Louisville, as an exception, fell 3 points on that day on selling of its stock by London, and the same stock experienced a further fall of 3 points on the following day. Trade in other railroad issues was feverish and irregular, owing to rumors of impending receiverships for certain roads. The following list shows the fluctuations

of some of the active stocks since October 5:

	High- est.	Low- est.	Closing, Oct. 11.
Am. Sugar Ref.....	92½	89	91½
Atchison, T. & S. F.....	20	18½	19½
Balt. & Ohio.....	69	68½	69
Chicago Gas.....	61½	59½	60½
Chic., B. & Q.....	83½	81½	80½
Chic., Mil. & St. Paul.....	80½	59½	59½
Chic., Rock Isl. & Pac.....	66	64½	64½
Del., Lack & Western.....	157	146½	151½
Gen. Electric.....	46½	43½	44½
Lake Shore.....	123½	122	123½
Louisville & Nashville.....	50½	48½	44½
Manhattan.....	126	124½	126
Missouri Pacific.....	25½	21½	22½
Minnesota Iron, asked.....			60
National Lead, Common.....	27	25½	26½
New York Central.....	103	101½	102½
N. Y., L. E. & Western.....	14½	13½	13½
Northern Pacific, Pfd.....	21½	20½	20½
Philadelphia & Reading.....	19½	18½	17½
Richmond & West Pt., Term.	3½	3	2½
St. Paul & Omaha.....	35½	35	35½
Union Pacific.....	19½	16	17½
Western Union.....	83	80½	81½

Government bonds are strong, registered 4s having advanced ½, and coupon 4s ½. A sale of \$10,000 of the latter was noted on Tuesday at 111½. The closing quotations were:

	Bid.	*Asked.
2s, 1891, registered.....	98	...
4s, registered.....	111	112
4s, coupon.....	111	112

Railway and miscellaneous bonds were fairly active and strong at the end of last week, but relapsed into inactivity during the early part of the present week.

Bar silver closed in London on Wednesday at 33½ pence per ounce, and in New York at 74¢ per ounce. The Treasury Department on Tuesday purchased 115,000 ounces of silver at its counter offer of \$0.7360 an ounce. The purchases thus far this month aggregate 495,000 ounces.

Exports of grain have fallen off during the week under review, but the outward movement of cotton has set in with some activity, and the total exports of merchandise show a satisfactory increase over those of the corresponding period of last year, while the imports are steadily decreasing.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, October 11, 1893.

The Pig Tin market has been dull and prices have averaged lower. The only new feature was quiet buying of stock for shipment to America to remain in bond pending action upon the proposed repeal of the duty. The demand for this account was readily met by some prominent dealers, and that fact, in connection with absence of other speculative interest and slow demand from consumers, caused weakness. Sales have been made at as low as £78 for prompts. At the close the market was steadier, with Straits quoted at £78. 5/ for prompt delivery and £78. 15/ for three months' futures.

The Copper market has been very quiet and without new feature. Some operators are still working to depress prices, particularly a few identified with the American market, but sales are not pressed as vigorously at the present time as they were a short time ago. Home consumers are re-

ported to be well supplied and the same is said of Continental consumers. There has been some improvement in the inquiry from India. At the close the market was quiet. Quotations were £41. 12/6 for Merchant Bars, prompt delivery, £42 for three months' futures and £46 for Best Selected English.

Aside from a few purchases of large lines of Oil sizes of Cokes there has been little movement in the Tin Plate market beyond very fair purchases of Charcoals for Canadian account in anticipation of closing of the season for shipping to that point. The Morlais and the Carmarthen works have been closed down owing to the depressed condition of the market. Exports last month were 25,000 tons, against 30,000 tons in September, 1892. The United States took 13,000 tons, against 22,000 tons last year. Stocks at Swansea are estimated at 239,000 boxes. Liverpool quotations are as follows:

IC Charcoal, Alloway grade.....	12/9 @ 13/3
IC Bessemer Steel, Coke finish.....	11/8 @ 11/9
IC Siemens.....	11/9 @ 12/
IC Coke, B. V. grade, 14 x 20.....	11/6 @ 11/9
Charcoal Terne, Dean grade.....	11.6 @ ..

Spelter is weaker with sales at as low as £16. 17/6 for ordinary Silesian and the demand slow.

Pig Lead has remained almost stationary at £9. 10/ for Soft Spanish, with business moderate and the demand quiet.

There has been some improvement in the demand for Old Iron, but not enough to affect prices a great deal. Pig Iron, Manufactured Iron and Steel generally remain quiet. Exports of Pig Iron in September were 77,000 tons, against 80,000 tons during the corresponding month last year. Last dealings in warrants were at 42/3 @ 42/4 for Scotch. 34/9 @ 34/10½ for Cleveland, and 44/7½ for Hematite.

New York.

Office of The Iron Age, 96-102 Reade street, }
New York, October 11, 1893. }

Pig Iron.—Buying continues on a moderate scale. Sellers, notably of Southern Iron, are inclined to some firmness. An offer to take 15,000 tons of warrant Iron, which was widely circulated in this market during the past ten days, did not lead to any business, because no seller could be found to meet the buyer's views. We quote Northern brands \$14 @ \$15 for No. 1; \$13 @ \$14.25 for No. 2; \$12.25 @ \$12.50 for Gray Forge, at tidewater. Southern Iron, same delivery, \$13.25 @ \$14.25 for No. 1; \$12.25 @ \$13.25 for No. 2; \$11.50 @ \$12.25 for No. 3; \$11.75 @ \$12.25 for No. 2 Soft, and \$12.25 @ \$12.50 for No. 1 Soft. Gray Forge is \$11.25 @ \$12.

Billets and Rods.—Some of the buyers of Steel Billets in this section have been tempted to purchase cash Steel by the low offers of Pittsburgh makers. What little export Wire trade is being done is based upon domestic Steel Billets. We quote nominally: Domestic Billets, \$20.75 @ \$23, and foreign Billets, \$28 @ \$28.50, tidewater; domestic Wire Rods, \$29.25 @ \$30, and foreign Rods, \$39.50 @ \$40.

Steel Rails.—The only order of consequence placed was a lot of 1500 tons for the Manhattan Elevated at private terms. A meeting of the Rail Manu-

facturers' Association is now in session in this city. It is believed possible that a lower range of prices may follow this conference. At this writing the meeting is still in session.

Track Material.—Small lots are selling at the following prices: Spikes, 1.80¢ @ 1.90¢; Fish Plates, 1.45¢ @ 1.60¢; Track Bolts, Square Nuts, 2.25¢ @ 2.40¢, and Hexagon Nuts, 2.40¢ @ 2.50¢, delivered. Concessions would be made for round lots.

Manufactured Iron and Steel.—Very little new business is coming up and 100-ton orders have become events. We quote nominally: Beams up to 15 inch, 1.75¢ @ 2¢; 20-inch, 2.10¢ @ 2.25¢, for round lots; Angles, 1.75¢ @ 1.90¢; Universal Mill Plates, 1.70¢ @ 1.90¢; Tees, 2¢ @ 2.15¢; Channels, 1.80¢ @ 2¢, on dock. Steel Plates are 1.65¢ @ 1.90¢ for Tank; 1.90¢ @ 2.10¢ for Shell; 2¢ @ 2.15¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.55¢ @ 1.9¢, on dock, and Common, 1.45¢ @ 1.55¢; Soft Steel Bars are 1.50¢ @ 1.70¢; Scrap Axles are quotable at 1.75¢ @ 2.10¢, delivered; Steel Axles, 1.70¢ @ 2¢, and Links and Pins, 1.70¢ @ 1.80¢; Steel Hoops, 1.75¢ @ 1.90¢, delivered; Cotton Ties, 70¢ @ 72½¢ @ 45 lb bundle, at mill.

Old Material.—We quote: Old Iron Rails, \$13 @ \$14; Old Steel Rails, \$8 @ \$9, and Wrought Scrap \$9 @ \$11.

A very striking illustration of the curious manner in which reports concerning industrial establishments are developed is furnished by an item which appeared in a Philadelphia paper. A report from Chester announced that H. C. Frick of the Carnegie Steel Company had been in Chester, Pa., and had come to purchase the Wellman plant, at Thurlow, near Chester. The additional comment was made that the Carnegie interest was anxious to get a foothold near Philadelphia, where a good market for the product could be secured. We need hardly point out the fact that the Pittsburgh mills do not find it necessary to come nearer to Philadelphia than they are in their raids upon its markets. So far as the history of the item is concerned, we are informed that it grew out of a visit to S. T. Wellman from an old friend, John Fritz of Bethlehem. In some way the name of the latter was twisted into Frick, and on that slender basis the imagination of the local reporter built the superstructure of guessing to which we have referred.

The following dispatch from Altoona has been published in the daily newspapers: "The employees of the Portage Iron Company, at Duncansville, on the 8-inch and bar mill trains were notified a few weeks ago of a proposed reduction in their wages, ranging from 23 to 33 per cent. As those portions of the mills in this district have been paid the Pittsburgh rate of wages for more than 25 years, and the reduction there has been but 10 per cent., the men have quit work and demanded a continuance of the established basis." The facts are that there is no strike at the works of the Portage Iron Company, Limited. The men have been paid off and discharged and the finishing mills have been closed down, because the owners found it impossible to compete with mills in the district and pay the Western scale of wages.

The department of geology at Colorado College has been placed in charge of Joseph K. Surls.

HARDWARE.

Condition of Trade.

SINCE the opening of October there has been a perceptible increase in the volume of business, but orders for the most part are small and jobbers report those received by them as very carefully assorted, covering a considerable range of goods in small quantities. As customary at this season, seasonable goods constitute a considerable portion of the business, but they are not moving in the usual quantities. Skates are referred to as in especially good demand, owing to the fact that stocks in dealers' hands were pretty generally cleared out last winter. In Builders' Hardware the demand is only moderate and limited principally to goods required to finish buildings in course of construction. Very little building is in progress, a fact which also accounts for the limited demand for Nails. A good deal of complaint is made in regard to Mechanics' Tools, of which much less than the usual quantity are being sold. In manufacturers' supplies also the volume of business is comparatively small and houses dealing in these lines of goods complain much more than those who handle or manufacture articles which go directly to the trade. A fair business is reported by dealers in Tin Plate, most of whose orders are referred to as coming from retailers and in comparatively small parcels. There are few quotable changes in price, but the market has rather a weak tone, the tendency being toward lower values. Collections on the whole are fair, but some houses refer to them as being difficult and unsatisfactory.

Chicago.

(By Telegraph.)

Shelf Hardware jobbers were agreeably surprised the past week by a decided increase in their business. The character of the orders received, however, was about the same as previously, regular Hardware not constituting more than the recent proportion. The large numbers of very small orders sent in entailed an unusual amount of work. The packing force in several establishments was obliged to work for several nights in order to make prompt ship-

ments, owing to the necessity of handling so many broken packages. It is an annoying feature of the present condition of the Hardware business. In ordinary time, with the demand running on full packages, there would have been no necessity whatever for night work in handling as large a volume of business as that of the past week. Quite a large number of Hardwaremen from the West have visited Chicago within the past few days in attendance at the fair. They report that business with them is not likely to be of a more than hand to mouth character this fall, because farmers are disposed to hold on to the bulk of their crops. The quantity so held is very large, but the means of providing better business is thus seen to be in hand whenever the farmers decide to sell. Heavy Hardware jobbers report a somewhat larger volume of business, but their trade is also running in the direction of very small orders requiring more than usual work to fill them. Collections are good; no complaint is heard on this score.

St. Louis.

(By Telegraph.)

The month is a third over and at this writing compares favorably with the corresponding period of last year. Retailers are sending in fair sized orders and show more disposition to buy freely than for some months past. Jobbers are not pressing sales, however, and continue to watch credits pretty closely. A good, cold snap would help things wonderfully, as the movement of cold weather goods has been exceedingly small. The shipments of cotton throughout the South have stimulated trade from that section, but it is still lighter than it should be at this season. Barb Wire and Wire Nails are inclined to weakness, particularly the latter.

Notes on Prices.

Wire Nails.—The Wire Nail market continues in substantially the same condition as at our last report, and \$1.30 may be named as a general price for carload lots at mill. Some of the manufacturers have endeavored to obtain a slightly higher figure, but on especially large or attractive orders it is understood that this price has been shaded. The volume of business is moderate, and none of the mills are running to their full capacity. They are careful to avoid an accumulation of stock, and in some cases have not been able to ship goods as fast as required, their orders being for the most part for immediate

shipment. The tone of the market is not at all strong.

Chicago, by Telegraph.—Wire Nail manufacturers report inquiries only moderate. Buyers who placed orders at very low prices some time since are complaining of trouble in getting delivery on such contracts and threats are made that the Nails will be bought elsewhere and the difference charged to the delinquent manufacturers unless they more speedily comply with their agreements. Prices on factory lots continue at \$1.40 to \$1.45, Chicago. Small lots are selling at \$1.55 from stock.

Cut Nails.—Notwithstanding the fact that the demand is moderate, the market for Cut Nails seems this week to be in a slightly better condition than last week, and the quotation of \$1 for carload lots at mill is quite generally adhered to, concessions being made in special cases. The market, however, is not strong, and it is not unlikely that a large order for a desirable assortment would secure relatively low figures. Small lots from store in New York are quoted at \$1.25 to \$1.30.

Chicago, by Telegraph.—Cut Steel Nails are in the same condition as previously reported. Orders are not large but are moderately numerous. Manufacturers are still quoting carload lots at \$1.20 to \$1.25, and jobbers quote \$1.30 for small lots from stock.

Barb Wire.—The market for Barb Wire is not in a very satisfactory condition, and somewhat lower prices have been developed. The quotation of \$2.25 to \$2.30 for Four-Point Galvanized at mill fairly represents the market, but a concession on the lower of these figures is made by some leading manufacturers. Painted is held regularly at 40 cents less. The volume of business is moderate, but it is understood that a good many small orders have been secured. Lower prices for export are also quoted, the regular price now being \$2.45, f.o.b. vessel New York, but it is understood that a somewhat lower figure is sometimes made.

Chicago, by Telegraph.—Manufacturers are doing a large business in Barb Wire. They have made decided inroads on the trade of jobbers, who report that for the past couple of weeks their business in this branch has been exceedingly light, while manufacturers talk much more cheerfully on the condition of the trade from their point of view. Carload lots of ordinary Galvanized Barb Wire are selling at \$2.40, while Glidden is quoted at \$2.50.

The jobbing price for small lots of ordinary Galvanized Barb Wire from stock is \$2.55.

Lawn Mowers.—The volume of business during the last season is referred to by the manufacturers as having been exceptionally heavy, the fact being that the low prices which have ruled have induced a very large sale of the goods, the season on this line having practically closed so far as the manufacturers are concerned before the financial disturbance of the summer. The outlook for next year is regarded by the manufacturers as promising, provided general business conditions are reasonably favorable. An announcement in regard to the coming season is made by Dille & McGuire Mfg. Company, Richmond, Ind., for whom S. A. Haines, Indianapolis, Ind., is manager of sales department. Their catalogue, to which we have already referred, contains the following revised list of their Mowers, which is subject to a discount of 70 per cent.

Inch.	McGuire's Diamond. Style D.	Diamond High Grass. Style L.	Western. Style U.	Magic. Style W.	Crown. Style K.
8.....					\$12.00
10.....	\$13.00		\$10.50	\$9.50	13.00
12.....	14.00		11.25	10.50	14.00
14.....	15.00	\$22.00	12.00	11.25	15.00
16.....	16.00	23.00	13.00	12.00	16.00
18.....	17.00	25.00	14.00	13.00	17.00
20.....		28.00			
24.....		31.00			
Pony Lawn Mower, each.....\$100					

Oil and Gas Heaters.—The Oil and Gas Heaters put on the market by the Manhattan Brass Company, 44 Murray street, New York, and 506 Masonic Temple Building, Chicago, and illustrated in this issue, are sold at a discount of 25 per cent. from the following list:

Star Heaters.		Each.
No. 40, Brass finish.....		\$7.00
No. 40, Nickel.....		7.75
No. 40, All Brass, including Cylinder..		7.50
No. 44, Brass finish.....		8.00
No. 44, Nickel.....		8.75
No. 44, All Brass, including Cylinder..		8.50
No. 46, Brass finish.....		10.75
No. 46, Nickel.....		12.00
No. 46, All Brass, including Cylinder..		11.25
No. 45, Brass finish.....		9.75
No. 45, Nickel.....		10.75
No. 45, All Brass, including Cylinder..		10.25
Hygienic Heaters.		Each.
No. 48, Brass finish.....		11.00
No. 48, Nickel.....		12.50
No. 49, Brass.....		13.00
No. 49, Nickel.....		14.50
No. 50, Brass.....		14.50
No. 50, Nickel.....		16.00
Gas Heater.....		5.00

Cordage.—Cordage at present is probably lower in price than for a longtime. During the past few weeks, while there has been little quotable change, prices have been tending downward and are now slightly lower. Manila is maintained pretty firmly at 8 cents basis for large lots, f.o.b. factory or New York; but it is understood that in some special cases this quotation has been slightly shaded. Sisal and New Zealand are about $\frac{1}{2}$ cent lower than a few weeks ago. The volume of business is comparatively small and there is a good

deal of competition among the manufacturers. The following are the present quotations for large lots, f.o.b. factory or New York, which are shaded in exceptional cases and are subject to a discount of $1\frac{1}{2}$ per cent. for cash in ten days:

Manila, 7-16 in. diam. and larger.....	\$b 8	¢
" $\frac{3}{8}$ in.....	\$b 8	$\frac{1}{2}$ ¢
" and 5-16 in.....	\$b 9	¢
" Tarred Rope.....	\$b 7	$\frac{1}{2}$ ¢
" Hay Rope, Medium.....	\$b 8	¢
Sisal, 7-16 in. and larger.....	\$b 6	$\frac{1}{2}$ ¢
" $\frac{3}{8}$ in.....	\$b 6	$\frac{1}{2}$ ¢
" and 5-16 in.....	\$b 7	$\frac{1}{2}$ ¢
" Hay Rope.....	\$b 6	$\frac{1}{2}$ ¢
" Tarred Rope.....	\$b 5	$\frac{1}{2}$ ¢
" Medium Lath Yarn.....	\$b 6	¢
New Zealand, 7-16 in. and larger.....	\$b 6	¢
" $\frac{3}{8}$ in.....	\$b 6	$\frac{1}{2}$ ¢
" and 5-16 in.....	\$b 6	$\frac{1}{2}$ ¢
" Hay Rope.....	\$b 6	¢
" Tarred Rope.....	\$b 5	$\frac{1}{2}$ ¢

Stove Boards.—While as seasonable goods there has been a fair demand for Stove Boards, the volume of business is referred to as considerably less than usual. In the matter of prices there has been comparatively little irregularity, as the leading makers agree pretty well in quotations. There is, however, some

this method, and with the addition of two coats of shellac and one of hard oil finish a light and attractive appearance is obtained and a suitable background afforded on which to place numbers, samples, labels, &c. There are ten regular sizes, all $10\frac{1}{4}$ inches long, varying in width from 3 to 18 inches and either $3\frac{1}{4}$ or 7 inches high. Mr. Green also makes a Screw case of chestnut with knobs of like material, the whole front varnished. The case is $29\frac{1}{4}$ inches high, $25\frac{1}{4}$ inches wide and $8\frac{1}{4}$ inches from front to back, containing 80 boxes of five different sizes, each with a capacity of not less than one gross of Screws. Special sizes of boxes are made to order in lots of 50 and upward of each size.

National Retail Hardware Dealers' Association.

WE ARE IN RECEIPT from the secretary of the National Retail Hardware Dealers' Association of the following communication explaining the scope and objects of the organization and directing the attention of the trade to the work it is undertaking. We take pleasure in giving it place in our columns:

NATIONAL RETAIL HARDWARE
DEALERS' ASSOCIATION,
OFFICE OF THE SECRETARY,
9 DOCK SQUARE,
BOSTON, MASS., October 4, 1893.

During the past few months, much has been written in the columns of your valuable paper in reference to the need of organization on the part of the Hardware trade. Many suggestions of practical value have been presented, and several local associations have been established, but in the opinion of the writer the most important step that has yet been taken, and one that will prove most beneficial to the trade in its entirety, manufacturers, jobbers and retailers included, and that will also in the end secure to the consumer a far better return for the money invested in purchasing than heretofore, is the action taken on September 20 at Chicago in the formation of the National Retail Hardware Dealers' Association.

So much has been written as to need of organization and the method by which it can best be accomplished, that I shall say but little on these questions, but shall endeavor to show in what manner the different departments of the business are to be benefited.

1. As to the manufacturer: It is my opinion that but few, if any, really desire to do a retail business, but they have been driven to it by the force of circumstances, and in many cases have been led to take the first step by the action of dealers, who, not having sufficient stock or samples of fine goods, or from a feeling of their inability from one or another cause to handle a job satisfactorily, have called in the services of some manufacturer. Such cases have very readily led the manufacturer to believe that he could well dispense with the services of the retailer. Other

difference in the prices quoted, and careful buyers usually find it worth their while to look into the market before placing orders.

Glass.—Manufacturers of Glass evidently consider that the condition of trade does not justify them in starting up their factories. This apparently has more to do with the lack of interest which they take in an adjustment of the wage scale than because an agreement could not be reached. If there was a prospect of making money if the manufacture of Glass was begun and continued the fires would be started even if last season's wages had to be paid. It is reported that the low prices at which Glass has been sold to the jobbers who are members of the National Window Glass Association has left no profits for the manufacturers, and that they now feel that it would have been better if jobbers had not been admitted as members. The situation is intensified by the announcement of a further reduction in the price of foreign Glass on the other side. Quotations on all kinds of Glass remain unchanged.

Hardware Boxes.

A. H. GREEN, 22 Park place, New York, is in a position to supply from stock dovetailed white pine boxes, suitable for shelves in retail Hardware stores. This provides a receptacle for the contents of paper or pasteboard boxes, and uniformity is preserved. Enterprising merchants are more and more availing themselves of

manufacturers, learning of this action on the part of a competitor have felt that, as the saying is, they would "get left" if they did not do the same thing, have therefore been drawn into this competition, and the competition has been so sharp and the profits so much reduced that it seems to the writer they will hail with joy the formation of an association whose objects, if attained, will put an end to all such competition.

The same argument will apply as well in the case of the jobbers as the manufacturers, although they have not the same excuse for seeking this retail business, as it is doubtful if any jobber has ever been called upon by a retailer in the way above stated. Yet the result has been the same; competition has been sharp, profits reduced; and, as a certain prominent member of the jobbing trade remarked to the writer a short time since, "We should be glad to stop it if our competitors would also do it."

The consumer, as he often learns to his cost, can only get well served through the attention of some one who has not only learned how to sell goods, but how to apply them, and such knowledge can only be acquired after years of experience, and such service can only be secured through a representative retail house. The experience of many years has demonstrated that none other than the retail Hardware dealer can trim a building in a manner that will be at all satisfactory, and the customer who profits by this experience is rarely called upon to pay more than a fair interest on the investment.

Having thus, as it seems to me, demonstrated that it is for the interest of all classes to make this National Association a success, let us consider a little the methods to be pursued to accomplish this end.

In this connection, and to set at rest any doubts that may arise, I will state that it is not intended to be anything but national in its character.

Nothing approaching the nature of a trust or combination for advancing prices is intended.

The objects are simply to protect us in what we consider to be our rights—viz.: the handling of legitimate retail trade, without having to contend with both manufacturers and jobbers, and the consideration of any and all questions of importance, and last but not least, the establishment of a brotherly feeling throughout the trade of the entire country.

I would suggest, in furtherance of these objects, that every retail dealer who shall read this article would at once send to the writer a request for an application.

The membership fee has been fixed at \$5, a sum so small that no one can but acknowledge that it will be more than repaid in the benefits derived.

I would also suggest the formation of local organizations as adjuncts of and in support of the National Association, and shall be pleased to correspond with dealers from any State in the Union, to receive any information or advice and to give such as may be required of me.

HIRAM G. JANVRIN, Secretary.

Arrangement of Stores.

SEATTLE HARDWARE COMPANY

THE BUILDING occupied by the Seattle Hardware Company, Seattle, Wash., for their wholesale and retail business was built especially for the firm. The store, a ground plan of which is shown in Fig. 790, is 54 x 108 feet, in the Colman Building,

20 x 6 feet, divided by a column, take up the front center of the store, with entrance doors on both sides. The windows are not incased at the back, but are divided from the store room by heavy curtains hung on silvered poles, 3 feet above the floor of the show windows. Back of these windows is a platform 2 feet wide for sampling Coal Hods, Water Coolers, &c. The arrangement of showcases, counters and

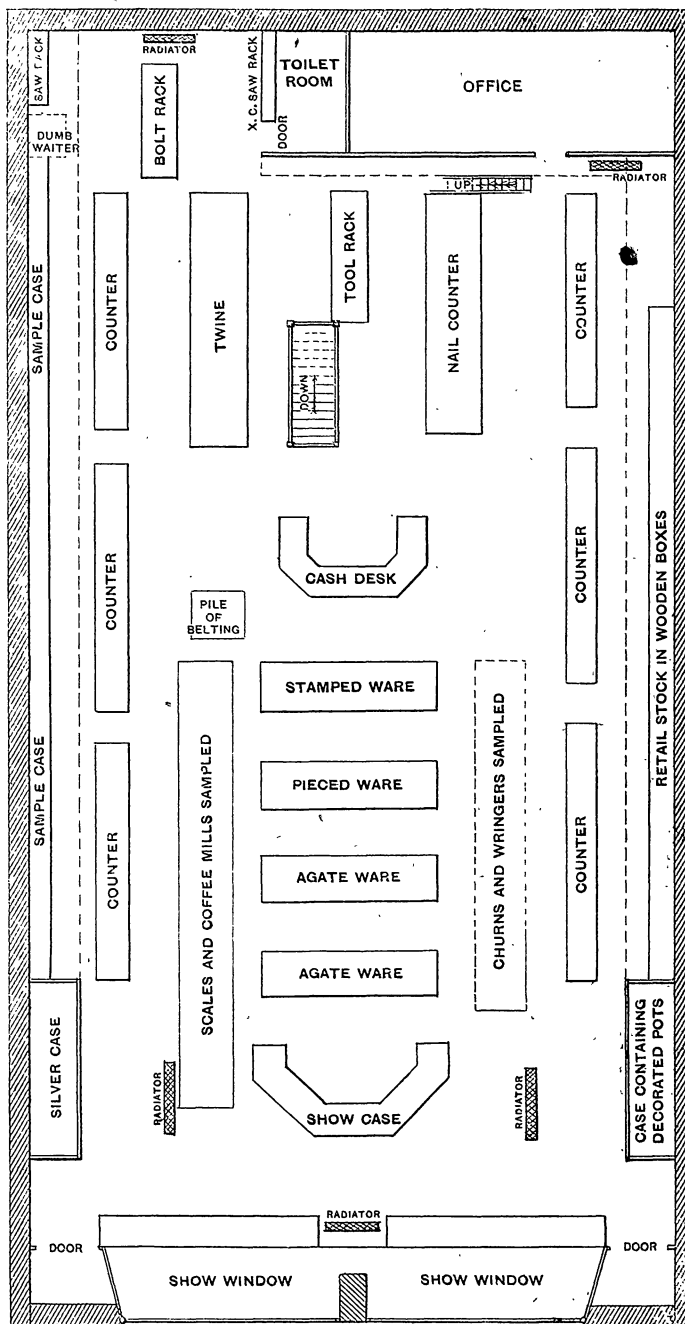


Fig. 790.—Plan of First Floor.

corner of Front and Marion streets. Under the main store are two basements, each 27 x 108 feet. Across Post street in the rear is the warehouse, 108 x 117 feet in size, facing on West street; this is connected with the wholesale department by a bridge. The establishment is considered exceptionally complete; especially the retail department, to which the following illustrations and descriptions relate:

As shown in Fig. 790, two large show windows, each having a space of

shelving is shown in the ground plan, these being of polished ash, fitted up at a cost of \$9000. Fig. 791 gives a view of the shelving on the right side of the store, showing the counters and showcases through the center and the offices in the rear. On entering the store, to the right is an upright wall case, a portion of which is seen in Fig. 791. The case is 9 feet high and 15 feet long, having five large plate-glass doors mounted on patent sheaves. The interior of the case is lined with red

cloth, and contains a fine display of Manning, Bowman & Co.'s, decorated Tea and Coffee Pots. Following this case is the retail stock of shelf goods and tools of various kinds, kept in small boxes of the proper size, neatly covered with green paper and sampled; price cards being pasted on the side of each box.

Fig. 792 shows the arrangement and sampling of Shelf Hardware, and also the cupboards under the ledge. These cupboards are 3 feet deep by 2 feet 8 inches high, and extend to the rear of the store, containing long tools, such as Planes, Saws, &c. The dotted lines in Fig. 790 represent an elevated platform above the shelf boxes, which is

packages, as shown in Fig. 793. It will be seen that the shelving is cut out so that a firm grip may be had on the boxes in drawing them out. On entering the store to the left is a case like the one on the opposite side of the store, lined with red cloth, which is used for silverware, Fig. 794. Next to this is a long case with plate-glass lifting sash, the case being 9 feet high by 69 feet long. It has a green back ground, and contains—all kinds of Hardware nicely sampled, for the use of the salesmen in the wholesale department. A section of this case, with samples, is shown in Fig. 795. Above these cases is the platform and shelving, as described above.

writing letters, &c. To the left of this room comes the treasurer's office; then the Cutlery room, this being 6 x 10 feet with shelving for Cutlery, Revolvers, &c. Next to this room is the office of the wholesale department, then the manager's office and purchasing department. The rooms below, on the main floor, are the general offices. Under the stairway to the upper offices are tiers of drawers to accommodate Horse-shoe Nails, Bulk Tacks, Brads, &c. Since moving into their present quarters, the firm have added several lines of goods to their already large stock of Hardware, and are reaching out in every direction, increasing their jobbing trade, which now includes a large

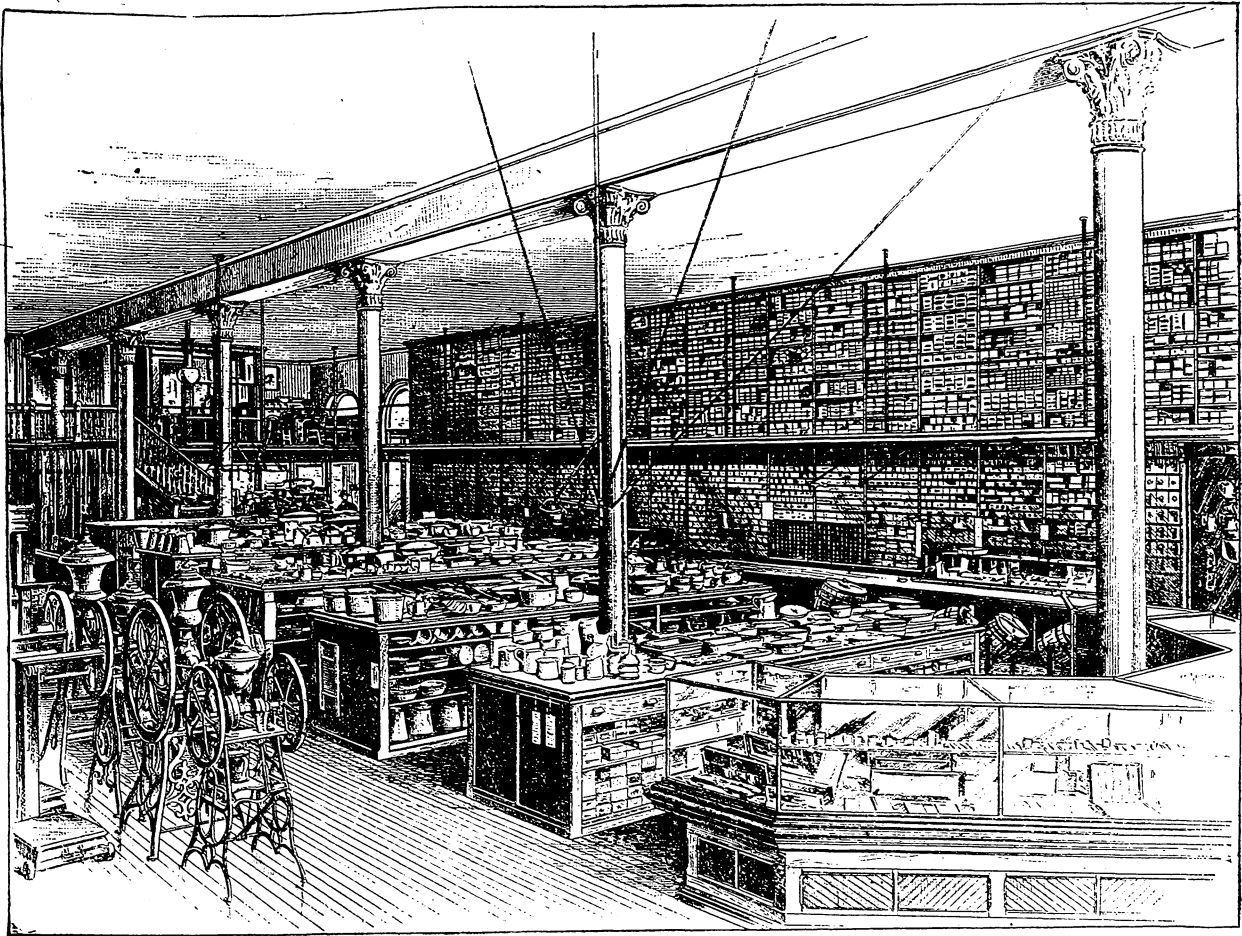


Fig. 791.—General View of Salesroom.

also seen in Fig. 791. This platform is 4 feet wide, and extends along both walls, and the rear of the room. The shelving on the platform is 2 feet deep, extending to the ceiling, and is used for wholesale stock of light shelf goods. Tinware, Agate Ware, &c., are sampled on counters through the center of the room, making an attractive display. For all goods not contained in sampled boxes on the shelves, Root's Nos. 32 and 33 price cards are used, except the retail stock of Tinware and Agate Ware, this having the retail price marked on each article. The cash desk is located in the center of the store, back of these counters, Fig. 790, and is fitted up with Lampson's cash carrier system.

An ingenious arrangement is provided for hand saws in the original

The Nail counter shown in Fig. 796, with Scales sampled above, contains an equal number of Nail bins on each side, the total number of which is 102. This being situated on the main floor makes it very convenient, besides giving ample room for a large retail stock of all kinds of Nails. The upper tier of bins project over the lower tier, thus allowing Nails to drop on the floor instead of into the lower bins.

Fig. 797 gives a view of upper and lower offices with stairway, the location of which is seen in Fig. 791. The platform upon which the upper offices rest is the same as mentioned before, except that it is 15 feet wide instead of 4 feet as the side platforms are. At the right hand of this platform, Fig. 791, is a room for the use of salesmen, for

territory east of the Cascade Mountains, and an increasing trade in British Columbia, and as far north as Alaska, where a large trade is already established. The Seattle Hardware Company commenced business in 1885, the successors of Ballard & Sox, the Burwell Brothers entering the firm with Messrs. Ballard & Sox at that time. In the spring of 1890, shortly after the great fire, the members of the Black Hardware Company of Detroit, Mich., came into the firm, and its present officers are as follows: President, C. A. Black; vice-president and manager, A. S. Burwell; secretary, C. H. Black; treasurer, A. P. Burwell. The following are also stockholders in the firm: M. D. Ballard, F. D. Black, John L. Simpson and E. B. Burwell. The retail department is in charge of E. B. Bur-

well, and the wholesale department of John L. Simpson and C. H. Black. The firm employ 80 men.

How to Treat Clerks.

FIRST ARTICLE.

BY FRED MACEY.

IT IS A NOTABLE FACT that almost every man who has made a marked success of his business has possessed and exercised the ability to gather and keep about him good assistants. To be able to do this is one of the richest faculties a business man can possess. A man's start and early growth in business depends entirely upon himself; but as business extends duties multiply, and he is forced sooner or later to divide his duties and intrust some of them to hired help. To know just the right kind of help to select, what duties to place upon it and how to treat it to secure his best services, is something that every business man must possess.

HUMAN NATURE.

A careful study of this subject forces upon one the fact that, while all men have their own peculiarities, which must always be taken into consideration with them as individuals, yet there is a certain likeness in human nature that makes it possible and necessary to take a certain position regarding the treatment of those in the employ of another; *e. g.*, it would not be practical for an employer to insist upon his bookkeeper using some set rule to calculate the correctness of an invoice—how he does it is a part of his education—but it is perfectly right for an employer to insist that it shall be calculated correctly. Neither would it be policy to set up certain rules as to how a salesman shall make a sale of goods, but it is entirely correct to require that if he sells he must do so at a certain price. How he does it is characteristic to himself and must be left very largely to him, but that it shall be done, and with certain results, is something that an employer has a perfect right to require.

HIS EMPLOYER'S INTEREST.

All men are engaged in business to make money, and the sooner an employer balances everything with this final end in view the better it will be for his best interests. Clerks should not be an exception to this rule, and no business man should keep in his employ any clerk that does not earn more than he receives, and it should be the aim of every clerk to serve the best interests of his employer, and the best service can only be given when a clerk works as if his employer's interests were his own. Few clerks work from this standpoint, but it is the only true one to work from. The rapid promotion of the clerk who is not afraid to work, who is constantly suggesting where small leaks may be stopped, expenses lessened, trade improved, business extended, is ample testimony to prove the truth of this

rule—a clerk of this stamp is worth a dozen of those whose main aim seems to end in putting in so many hours for so many dollars.

PROMOTION.

While it is true that the value of a clerk to his employer lies mainly in himself, yet very often the employer himself is very largely to blame for the lack of results from his help. Instances come to mind of a young man

outset of just what is expected from him. Give him a definite field to work in and then insist upon results. Give him all the encouragement possible, but do not lose sight of results. They alone count in business. By giving him a definite field to work in the main cause for jealousies among clerks has been removed. Yet these outlines must be elastic enough to permit of suggestions that will be to the interest of the business. Throw the responsi-

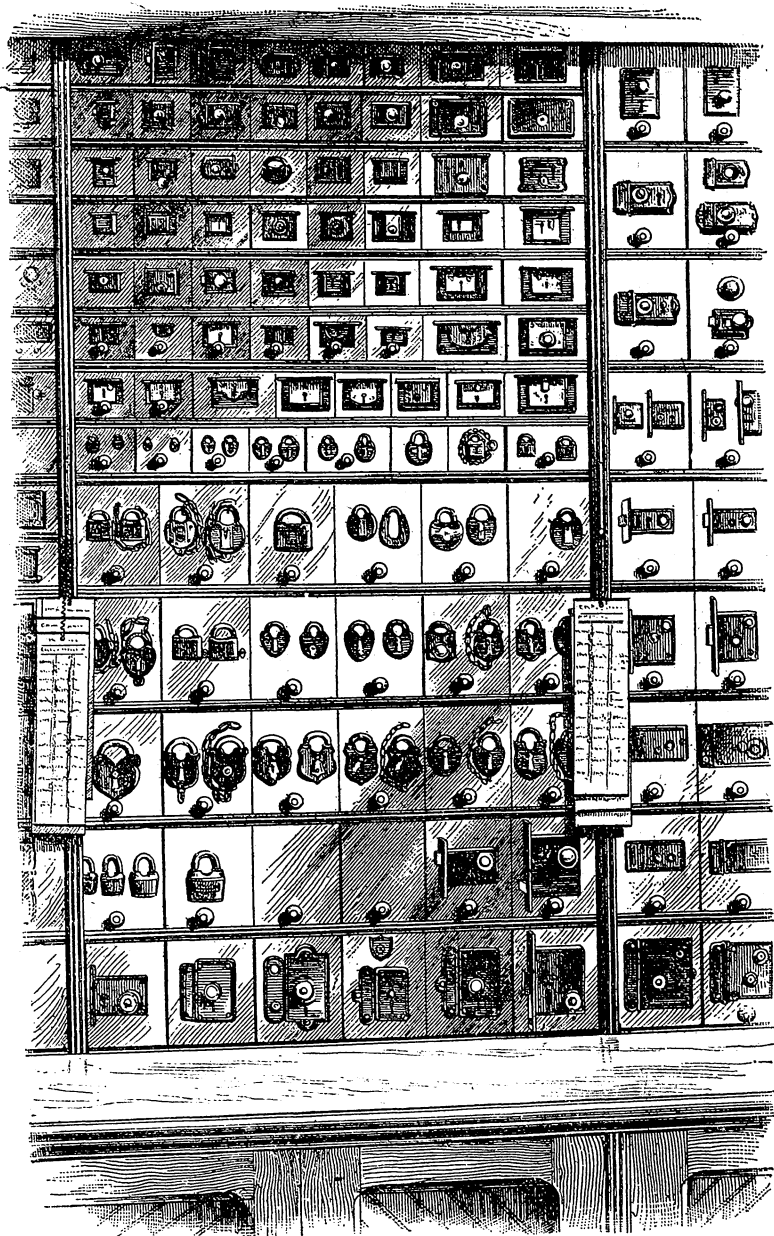


Fig. 792.—Arrangement and Sampling of Shelf Hardware.

who has left the service of one employer for that of a competitor. With one he could make but little progress, with the other his promotion has not only been rapid, but well founded. Why should this be so? The only answer that seems reasonable is, The one did not appreciate his ability and study to draw out his good qualities, whereas the other did.

INSIST UPON RESULTS.

Perhaps one of the most important points in dealing with a clerk is to have a definite understanding at the

bility of a certain department upon a clerk. Hold him accountable for its success, and then, and not until then, can his ability be fully measured. No business man can hope to achieve success without some definite end in view. Neither can a clerk.

BEING SOCIAL AND FAMILIAR.

A business man should command the respect of his employees. It is much pleasanter to receive a word of encouragement from an employer who is thoughtful in his suggestions, sincere in his actions, thorough in his work

and careful of his character, than from one who is not. A cold shoulder should be turned to all familiarities from clerks. They should cease at once. They never are productive of any good and certainly do harm. Do not confound being social and being familiar. It is an employer's duty to be social toward his employees, but familiar, never. An employer who is familiar with his clerks is generally not their best friend and seldom commands their respect.

MONTHLY WRITTEN REPORTS.

Clerks should feel that their efforts are appreciated, and it is an employer's

fluenced in these matters by a strict sense of justice, and justice only. Relationships, friendships, favoritism or sentiment should find no consideration whatever in these matters. When a young man feels that nothing stands between him and promotion except merit, he then has an incentive to push to the front, and it is an employer's duty to see that he has credit for what rightly belongs to him. Perhaps there is no more practical way to solve this question than to have each clerk make a monthly written report of what he has done. Knowing that a report of this kind must be presented to his employer, a clerk's pride and ambition

the multitude of cash registers and similar devices in constant daily use testify to the unreliability of help. It is an employer's duty to insure

HONESTY

as far as possible, but just how to do it each employer must decide for himself.

Confidential clerks are an absolute necessity in every business, yet how difficult it is to find them—somebody who can be trusted, who is not afraid to work, who watches his employer's interests as if they were his, who has good habits, some one who can be relied upon at any time, who never says a thing is so unless it is so.

GOING TO A COMPETITOR.

The extent to which a business man takes a clerk into his confidence must be decided by himself. There is always the liability of a man's help becoming dissatisfied and going with a competitor. This cannot always be

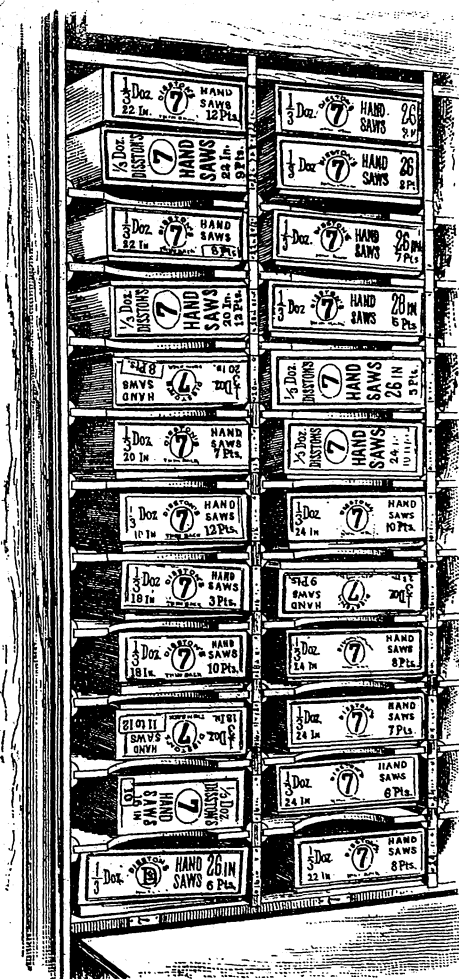


Fig. 793.—Shelving for Saws.

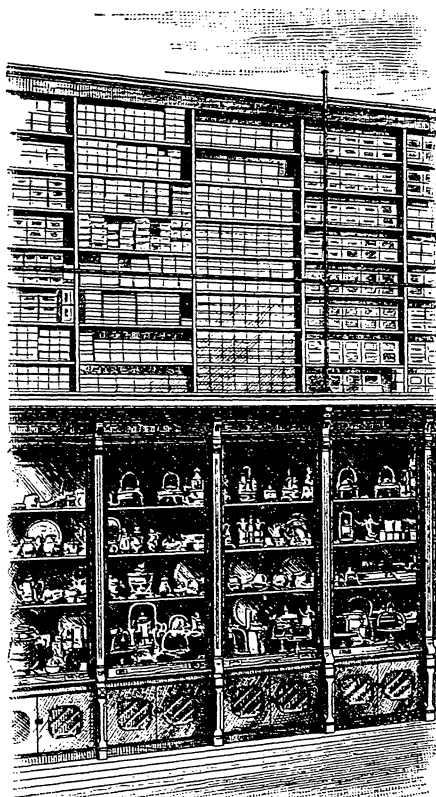


Fig. 794.—Silver-Ware Case.

duty to know what they are doing. Many a faithful clerk has been wronged by an employer not making it his business to know for himself, and know beyond a doubt, where to place the credit for a valuable suggestion. Many times a trusted clerk is less competent than some of his assistants. Many times he takes credit of merits that belong to another, and in return receives the advancement that rightly belongs to an assistant.

Compensation of employees is one of the vexed questions that a business man must contend with. While it is unquestionably an employer's right to say what he can and cannot afford to pay for a service rendered, yet it is his moral duty to allow himself to be in-

will lead him to make a good record. He becomes careful, thoughtful, ever on the alert to make a suggestion that will help the business, ambitious to produce good results. There is an incentive in these reports to a clerk to do his best. And not only this, the employer also gets better work, gets a better idea of what is being done, and knows where to place the credit. An employer who will use these reports, verify them and adopt good suggestions from them, places himself both in a position to compensate his help justly, and to adopt improved methods for his business.

UNRELIABILITY OF HELP.

Honesty in a clerk is a quality that cannot be too fully appreciated, but

avoided, and it is poor policy to let him know more than is necessary to the proper discharge of his duties. Unnecessary knowledge can do a clerk no good and may do an employer great harm.

CONFIDENCE.

In selling goods, clerks should be furnished with a complete list of the prices at which they should be sold. These are the selling prices, and if any special occasion seems to warrant a special concession it should come from the management. What a dealer pays for an article should be kept a matter of confidence to himself and his buyers. This information in the hands of indiscreet clerks would do more harm than good.

LET THEM GO.

When an employer engages a clerk, he agrees to give in exchange for certain services a certain salary. If a clerk insists on his salary the employer has the same right to insist on his services. Punctuality in commencing work should be insisted upon. Many an order is lost for no other reason than tardiness in opening up. Better be half an hour too early than three minutes too late. Dissatisfied clerks will appear in every business. There is only one of two things to do. Satisfy them or let them go. It never pays a clerk to stay after he becomes dissatisfied—much less does it pay his employers.

MISTAKES.

Don't expect too much from clerks. Don't expect that they will not make

profanity, lounging, use of tobacco, drinking, gambling, gossiping. The absence of these qualities, gives character to a house, draws a better class of trade than where they are permitted. A customer never objects to good

Trade Items.

THE CHICAGO HARDWARE TRADE very generally observed Monday, the 9th inst., as a holiday, it having been designated "Chi-

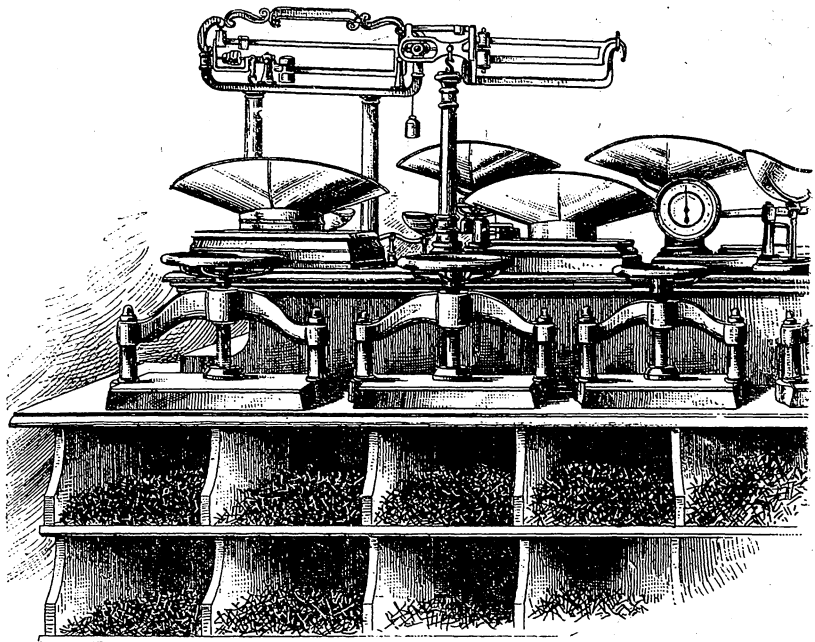


Fig. 796.—Nail and Scale Counter.

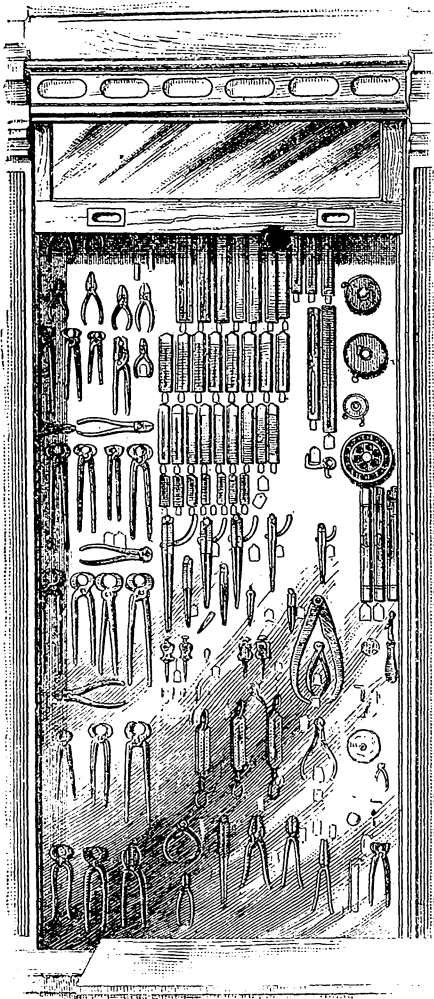


Fig. 795.—Sample Wall Case.

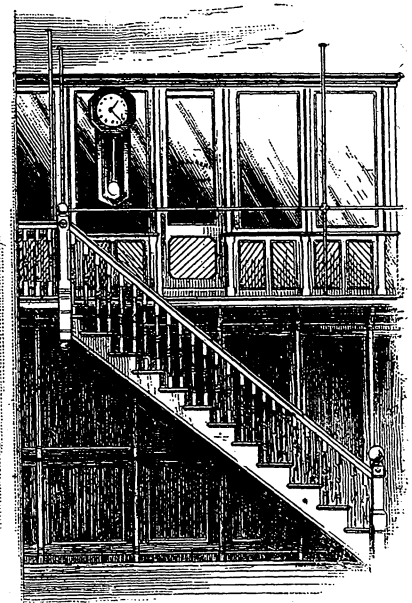
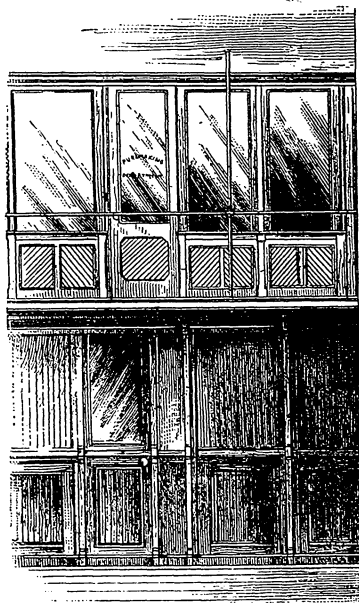


Fig. 797.—Stairway and Offices.

mistakes. They certainly will, all men do. When they make a mistake, don't forget all their good qualities; these very often more than offset the other. An employer should never lose control of his temper. Good seldom comes of it—but harm, invariably. A business man cannot afford to give way to his passion. As soon as he does, he loses the mastery of the situation. An employer cannot afford to employ uncivil clerks; he should insist on neatness, pleasant address; should discourage

character, but very often finds fault with the opposite.

PERSONAL INTEREST.

An employer should always manifest a personal interest in the private life of his help. It somehow seems to bind the interests of employer and employee more than anything else. An employer who can command both the love and the respect of his clerks can always get better service, more of it, and at less cost than one who fails in this respect.

cago Day" by the World's Fair management. The Yale & Towne Mfg. Company closed their branch house in that city, and at the suggestion of President Henry R. Towne every employee was presented with a souvenir ticket of admission to the exposition.

GRISWOLD MFG. COMPANY, Erie, Pa., issue a circular under date September 25, in which they refer to a marked increase in their orders for the past three weeks, and suggest to their customers the desirability of early securing a supply of their goods, so that they may not

be taken short when the demand fully sets in. The company state that they are now prepared to fill all orders promptly, but it will not be possible to do this if orders are held back until the last moment. In addition to their regular line of Hollow Ware, American Dampers, &c., they call special attention to their line of Model or Toy Ware for holiday trade; also to their New American Waffle Iron with improved hinge and handle, Post Boxes, Cuspidors, Letter Presses, Tobacco Cutters with name plates, French Waffle Irons, &c.

CHAS. CROISSANT AND JOHN CROISSANT issue a card to the trade announcing that the business of Martin Croissant, Albany, N. Y., whose death has been noted in these columns, will be continued by them under the same name as heretofore.

LEGGETT & BRO., 301 Pearl street, New York, have recently secured a patent on the combination of prepared cork, brush and paper seal, used in connection with their new Glue brought out not long since. The cork is so prepared that it does not stick to the bottle, no matter how often removed and replaced, or how much the brush comes in contact with the neck of the bottle. The paper strap or seal is to keep the package intact until placed in the user's hands.

TAUNTON WIRE NAIL COMPANY, Taunton, Mass., are making special Box Nails, cut with a box or blunt point, so that if they strike a knot they will penetrate it, or else they will double up if the knot is too hard. The manufacturers remark that if a longer pointed Nail strikes a knot it will glance off one side and come out through the side of the box, which not only spoils that part of the box but necessitates taking the box to pieces in order to get that part out, or else throwing the box away altogether.

THE LENOX SHEAR COMPANY, Brookfield, Conn., are marketing a steel laid tempered straight Trimmer, both in full nickel and japanned handles, with jointed and unjointed blades. One of their brands is now made with a brass oval head screw and hexagon nut, with a washer under the head for a pivot on which the blade moves.

WILMOT & HOBBS MFG. COMPANY, 20 Murray street, New York, refer to the success so far achieved by their copperized steel anti-rust Oiler, recently put on the market, as evidenced by the quantities ordered. One of the principal objections to steel Oilers heretofore has been their liability to corrode. The company to prevent this are copper plating their Oilers both inside and outside. The outside is burnished to improve their appearance and render them more salable. The inside copper plating is to prevent rust and keep the oil from becoming gritty. The company refer to the fact that they are not in a combination on these goods and do not propose to be.

W. R. WALKLEY of the Peck, Stow & Wilcox Company has accepted an invitation to address the Hardware trade of Boston at a dinner to be given October 11.

THE HATCH CUTLERY COMPANY, South Milwaukee, Wis., and 97 Chambers street, New York, we are advised have been awarded first premium at the World's Columbian Exposition on all their goods, which include their patent bolt Shears and Scissors, Tinnern's Snips, Automatic Knives, Razors, &c. The

committee making the award refer to the exceptional merit of the Hatch patent Bolt and Washer, which is applied to the company's Shears, especially on account of its simplicity and practicality.

SHOENBERGER & Co., Juniata Iron & Steel Works, Pittsburgh, Pa., report that they are meeting with a good demand for their Extra Swaged, Roadster and Government Pattern Horse and Mule Shoes. We are advised that these Shoes are made from a special quality of soft homogeneous steel made by this firm, and that it is especially adapted for the manufacture of Horse and Mule Shoes, its present high quality being attained only after numerous and costly experiments had been made, with this object in view. New and improved machinery has also been recently introduced into their new factory, by which the capacity has been largely increased. The firm are sending out to the trade a catalogue descriptive of their different kinds of Horseshoes, giving full information in regard to their line.

Price-Lists, Circulars, &c.

C. SIDNEY SHEPARD & CO., 23 and 25 Randolph street, Chicago: Fall circular, under date of October 2. This is a 24-page catalogue of seasonable and other goods, comprising Common, Planished, Russia and Wood's Smooth Sheet Irons, Galvanized Iron, Soft Sheet Steel, Tin and Terne Plates, Metals, Wire, Rivets, Stove Bolts, Mica, Stove Boards, Fire Backs, Coal Hods, Coal and Fire Shovels, Stove Lifters, Pokers, Coal Tongs, Fry Pans and Skillets, Elbows, Oil Stoves, Roasting Pans, Dripping Pans, Tinnern's Tools, &c. This firm have adopted the method of illustrating the different styles of Sheet Iron bundles in their circulars, as well as boxes of Tin and Terne Plates. It this way the appearance of the catalogue is relieved by the insertion of cuts in the usually monotonous array of tables of sizes and prices. With regard to Coal Hods the statement is made that all their Hods are now made with stamped bottoms.

MILLER WIRE SPRING COMPANY, Bridgeport, Conn.: Regular and special furniture Springs, pillow and bed Springs. The foregoing are tempered japanned Springs carried in stock; the same Springs will be made at short notice of coppered Spring wire. They also make to order special shapes, styles, sizes, &c., in either coppered Spring or tempered japanned wire. The makers claim that as the result of their special method of tempering and japanning, all Springs run uniform in temper, size, shape, &c.

WILLIAM T. WOOD & Co., Arlington, Mass., Joseph A. Bogardus, 167 Chambers street, New York, agent: Ice Tools. Their fifty-ninth annual catalogue for 1893-94 illustrates Ice Elevators, Markers and Plows, Snow Ice Plane, Ice Chisels, Bars, Ice Adze, Ice Saws, Grapples, Forks, Sieve Shovels, Scoop Net, Ice Auger, Hoops, Tongs, Ice Axes, Scales, Hoisting Gins, &c.

THE DELAWARE HARD FIBER COMPANY, Wilmington, Del.: Hard Fiber Goods. It is stated that hard fiber is made from specially prepared vegetable fibers by subjecting them to the action of powerful chemicals and a vulcanizing process which, together with heavy rolling and pressing, completely changes the nature of the fibers, the product closely resembling horn, Goods, which are illustrated, made from

hard fiber, include Rods, Washers, Disks, Fittings, Tubular Fuse Blocks, Insulating Flanges, Gear Wheels, Track Washers, Warehouse Cars, Boxes, Baskets, Oil Proof Gaskets, Carriage Axle Washers, &c.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn.: Catalogue of fall and winter goods. Illustrations are given of Axes, Handles, Wedges, Saw Sets, Cross Cut Saws, Wood Saws, Coffee Mills, Lanterns, Lamps and Lamp Stoves, Oil Cans, Hollow Ware, Meat Cutters, Stove Pipe, Elbows, Coal Hods, Stove Boards, Shovels, Tongs, Chains, Registers, Scoops, Snow Shovels, Sleigh Bells, Sleds, Skates, silver plated Flat Ware, Table Cutlery, Carvers, Pocket Cutlery, &c.

JAMES A. TAYLOR & Co., Wilmington, Del.: Measuring Instruments of precision, also Adjustable Blade, Shell and Rose Chucking Reamers, Special Tools and Machinery. Illustrations are given of Measuring Machine, Caliper Machine, Correction Gauge Standards, Standard Reference Disks, Fixed Caliper Gauges, Adjustable Blade Reamers, Hardened Steel Mandrels, Adjustable Blade Shell Reamers, &c.

JOHN PRITZLAFF HARDWARE COMPANY, Milwaukee, Wis.: Price current of fall and winter goods. Among the goods to which attention is called in their 48-page illustrated catalogue are Axes, Saws, Meat Choppers, Snow Shovels, Stove Boards, Fire Backs, Oilcloth, Hay Knives, Corn Huskers, Lanterns, Oil Cans, Sleigh Bells, Lumbermen's Supplies, Saw Tools, Chains, Axe Handles, Loading Blocks, Wedges, Builders' Hardware, Cow Ties, Mauls, Skates, Cutlery, &c.

COATES CLIPPER MFG. COMPANY, Worcester, Mass.: Toilet Clippers. Advance sheets from their forthcoming complete catalogue, with artistic covers, are fastened together with colored cord. These few leaves represent their present series of Toilet Clippers, and are now issued that those in need of these goods may make selection.

THE NUBIAN IRON ENAMEL COMPANY of Cragin, Ill.: Circulars. One gives a partial list of jobbers handling Nubian in $\frac{1}{2}$ -pint Cans, also prints of cuts which the company furnish the trade for catalogue, circular or advertising purposes. Another is a testimonial from the World's Fair mechanical department stating that Nubian had been adopted for the boiler stacks after a thorough test.

It Is Reported—

That the Hardware firm of Lefavour & Lamson, Beverly, Mass., have dissolved. F. G. Lefavour will continue the business under his own name.

That the Hardware store of Graves & Tabor, East Aurora, N. Y., was entered by burglars a short time since and Cutlery and other goods stolen to the value of \$200.

That Sterling & Leece have succeeded E. H. Sterling in the Hardware business at Bishop, Cal.

That F. Haffele & Co., Fonda, Iowa, Hardware and Stove merchants, have sold out to S. A. Stevens & Co.

That Richardson & Imhoff is the style of a Hardware firm recently starting in business at Van Wert, Iowa.

That Leroy Yates has succeeded M. P. Elwell in the Stove business at Portland, Maine.

Brad Brackett.

Brad Brackett kept a wholesale store
Under the Spring hoe-tel;
And though his ware was in demand
It was hard ware to sell.

His stock of staple goods was on
A scale you seldom find;
Including pokers, shovels, tongs,
Andirons of that kind.

Although a skillful financier,
He would not gouge in trade;
Nor chisel any one a bit,
If ne'er a cent he made.

A plane and quiet man, he ne'er
Was known to stirrup strife;
A firmer friend one never saw
Engage in business life.

Possessed of hinge-ennuity,
That compasses one's ends,
He did his business on the square,
And had a host of friends.

'Twas not by any ax-ident
He rose above the rest;
The key to his success was that
He did his level best.

Nobody had a stronger faith
In printers' ink than Brad's;
He used to say he carved his way
To fortune with his adz.

He always paddled his own can-oe,
And, pulley as he might
Against the stream or with the stream,
Was sure to come out right.

Of being a strong partisan
He had the reputation;
But, rather than support bad men,
He'd bolt a nomination.

As a tack-tician he excelled—
In auger-nizing led—
Though screw-pulous, was sure to hit
The nail upon the head.

He deprecated rings and frauds,
And scorned a party tool;
In politics, religion, trade,
He observed the golden rule.

He was no misanthrope, but took
A file-anthro-pick view
Of life, with its vice-cissitudes,
As all of us should do.

A splendid "catch," he lived a bach,
Anvil-age belles were told,
They tried in vain his heart to gain
With beauty or with gold.

Though a teetotaler, he kept
The best of bars, 'tis true,
Where one could get his "nippers" and
All kinds of punches, too.

But fickle fortune chain-ged at last,
And caster threatening pall
O'er him, and with one fatal wrench
Deprived him of his awl.

His locks by sorrow's weight were turned
To silver, and were long;
He fell before the scythe of Time
To join Death's mighty throng.
—Detroit Free Press.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

There is still an element of uncertainty in the position of dry White Lead that has more or less restraining influence upon operations of large dealers in the lines of goods into which that pigment enters as a prominent ingredient. The irregularity in Linseed Oil is less pronounced, and figures in smaller degree among the influences that gauge the operations of careful buyers. But more potent than either of these is the fact that buyers, large and

small, continue to show decided partiality to pronounced conservative line of action. Grinders are taking bulk goods only as immediate wants dictate. Jobbers' purchases are gauged almost wholly by running count of stock. Retailers are quite as careful, and buyers of specialties manifest hardly the degree of interest that is shown at this season of the year.

White Lead.—The old list prices are kept in force by the National Lead Company and the sales agents identified with the combine state positively that no concessions are being made in this city or vicinity. From outside sources the information comes that the official quotations are shaded in other territory in order to meet the low quotations made by a few "outside" corrodors. In this respect Dry White Lead figures most conspicuously, with carload lots reported sold at as low as 5½¢, net cash, or ¼¢ below the combine price for similar quantities, exclusive of regular discounts. In remote instances similar concessions, it is said, have been made on Lead in Oil. That jobbers are still selling on a very narrow margin over cost is the fact and the surface indications are that the market has more weak features than strong ones at the present time. The item of cost and peculiarities of the trade are, at all events, being carefully followed in all directions.

Red Lead.—Purchases of foreign brands have been on a smaller scale, and it is plain that large consumers are well satisfied with looking after stock that will be due shortly on recent contracts. Prices have not weakened perceptibly, but seem to be rather soft. In domestic brands there has been little movement, but, to all accounts, the business effected was at former prices.

Litharge.—Fairly good orders have been placed by glass and rubber manufacturers for low grade product used in the respective lines, but the higher grades used in the Paint trade have met with merely routine sale. Prices are still somewhat variable, but no weaker than they were ten days or a fortnight ago. The demand for French and German brands has moderated and is now of very ordinary character. As natural under such conditions it is easier to buy at prices that looked very cheap a short time ago. To that extent the market is easier. There has been no change in quotations for domestic stock and the demand for the same continues slow.

Zincs.—Deliveries of domestic Oxide in this vicinity have been hardly up to the full average for this season of the year, although on a somewhat larger scale. New business has been uneven and only fair in the aggregate amount. There is still some irregularity in prices on actual sale, but no change in quotations. Former list prices and terms are quoted for foreign brands, but the regular rates are being "cut" more or less in a quiet way, and cash buyers receive more than ordinary favors.

Colors, &c.—In the leading lines of Dry Colors there has been no decided change. The same may be said of Oil Colors. Specialties in the respective lines have fared somewhat better in point of sales, but in no other particular. The prompt payer or cash buyer, in fact, receives special favors. The volume of business is only fair for the season.

Oils and Turpentine.

The movements in prices have been on a narrow scale during the past week

and transactions have continued on conservative lines of the most pronounced type. In the latter connection a few exceptions may be noted, but even there the difference from the general movement was in closing deals that have been under negotiation for some little time past, rather than in the nature of strictly new business. It is especially remarkable that fluctuations in prices have not only been few but slight, and it is impossible to point out where either buyer or seller has made more than shadowy gain.

Linseed Oil.—The margin between prices for Western and New York City brands is about the same as it was last week, and the general condition of the market is very similar as well. City brands are still quoted at 40¢, with usual allowance for packages. Western brands are about 2¢ less, without as liberal allowance, and the contest in the West that has a certain amount of influence here continues. It would seem proper to remark, however, that the Western conflict is mostly local and that Eastern buyers would have to take carloads of Oil to secure stock at the extremely low figures quoted there. Meanwhile, distribution at this point is hardly up to the early October average, and the demand is slow as well.

Cotton Seed Oils.—There have been acres of writing and a certain amount of calm consideration regarding the market for this line of Oils, but the finest theories advanced have failed to connect. The market thus remains in a state of irritating uncertainty and dependent largely upon export purchases that fail to materialize. Still, prices are fairly maintained at 84¢ @ 86¢ for prime crude, 89¢ @ 40¢ for prime Summer Yellow, and corresponding figures for other varieties.

Lard Oil.—There has been no further advance in prices, but the market is very firm, since the movement in cost of raw material has not favored venturing with sales on a lower basis. Hence prices for prime present make Oil stand at 75¢ @ gallon, while the low grades are relatively as high in the face of merely ordinary demand.

Fish Oils.—Upward of 800 barrels of crude Sperm Oil have been sold at 65¢ @ gallon, including about 300 barrels for export. This reduces the supply in first hands to about 8500 barrels. In crude Whale Oil there has been hardly anything doing, and the market is still enigmatical, but apparently steady. There have been a few sales of crude Menhaden Oil at the combine prices, and the market is unchanged. Bleached and pressed Oils move rather slowly, but chiefly at the prices that have ruled for some time past. Cod Oil is selling at former prices, but in a moderate way only.

Miscellaneous.—Cocoanut Oils are firmly held at the higher prices established last week, but the buying has been slow and the market is under speculative influence in some degree. Common Olive Oil in barrels is held firmly at full former prices for spot stock and lots in transit, say 58¢ @ 60¢ @ gallon; but the fact that forward shipments are offered at 55¢ @ 56¢ holds business in abeyance. Red Oils find merely routine sale at about former prices.

Spirits Turpentine.—In the face of quite large stocks here the average of prices has been somewhat higher, but the market shows weakness toward the close, with sellers at 28½¢ @ 28¼¢, ex-dock, according to style of package.

Oil and Gas Heaters.

The accompanying cuts represent three styles of a line of oil and gas

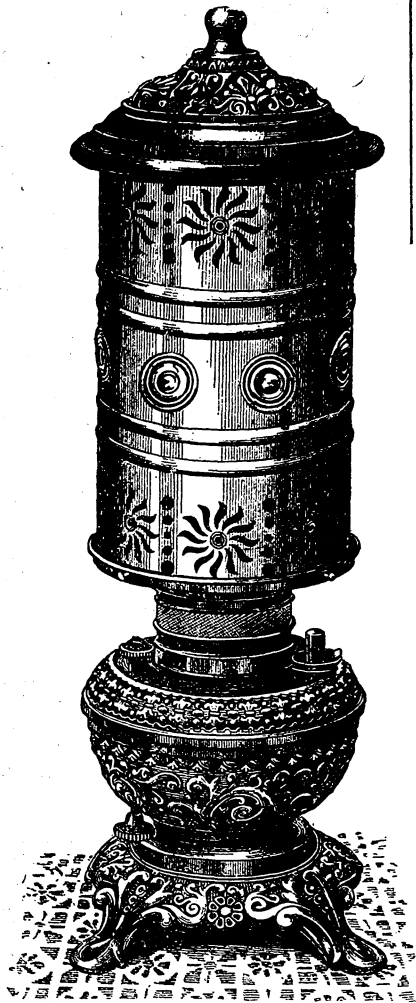


Fig. 1.—No. 40 Star Heater.

heaters manufactured by the Manhattan Brass Company, 44 Murray street, New York, and 506 Masonic



Fig. 3.—Drum for Hygienic Heater.

Temple Building, Chicago. Fig. 1 shows the No. 40 Star heater, which is made entirely of brass, with the excep-

tion of a Russia iron drum and aluminum top or cover. The base is nickel plated, of attractive design, with central draft burner and large wick. The wicking arrangement is simple, the wick being slipped over a cylinder, which expands at the top as the cylinder is turned down, and is thus held in place by teeth, without the aid of bands or tying. The wick is raised or lowered by turning the thumb screw either above or below the base. By turning the small projecting knob in the oil reservoir funnel, which is opposite the wick raiser, a register is opened, and into

reservoir, whether full, half full or empty, enabling one to see at a glance when the reservoir needs replenishing with oil. The drum is held in position on the rim by a loose hinge and spring; in lighting the heater the spring is pulled back and the drum is tipped backward. The rim is perforated at the bottom, and the drum has perforations at the top as well as in the sides. When it is desired to heat anything at the top of the drum, or to have the heat ascend, the aluminum top is taken off, leaving a flat surface. The point is made that the movable top, being made



Fig. 2.—No. 48 Hygienic Heater.



Fig. 4.—Gas Heater.

of aluminum, will not discolor. The manufacturers claim that there is no disagreeable odor from these brass heaters, that 1 gallon of kerosene will heat a room 8 to 12 hours, and that the heaters may conveniently be carried from place to place. The heater is made with three other styles of bases besides the one shown, one of these bases being square. Bases are furnished in brass finish, nickel and all brass; also with brass drum. The Hygienic heater, shown in Fig. 2, besides embodying the advantages of the Star heater, has a water tank to moisten the atmosphere. The tank surrounds the burner and is designed to hold enough water to keep up evaporation until the oil tank needs replenishing. The deflector, which in Fig. 2 is being held in the hand, has perforations at the inner edge through which the vapor passes as it rises from the heated water. Thus rising close to the flame, the moisture is thrown out into the room. The No. 48 heater weighs 12 pounds, is 33 inches high and has a drum 9 inches in diameter. The drum and movable top of the gas heater in Fig. 4 are the same as used on the oil heaters. It is claimed that the gas burner is so constructed that the gas is superheated before being burned, in this way utilizing the gas to better advantage than in the ordinary burner.

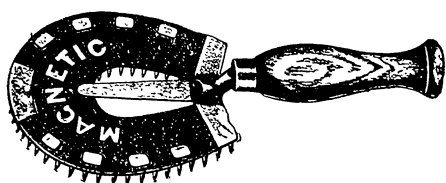
The following order, which betrays its German origin in every line and nearly every word, says a correspondent of (London) *Ironmongery*, is the most remarkable compound of mixed Ger-

man and English that ever came under my notice: "Mr. Glark blees sent me one of jur 7.9 jene revolvers und on box of cardridges as juick ju cann i will sent the mony on as sohn i resiev it the revolver und cardridges blees obleidg as juick ju cann send to" &c. The address on the envelope is a curiosity indeed. Substituting English letters for the German script where employed, it runs:

"Mr. Glark
for Street Exeter
Nearle obosite
Market Plaz
Tule Shopp."

Magnetic Curry Comb.

The Ives Mfg. Company, North Granville, N. Y., are introducing the magnetic curry comb illustrated herewith.

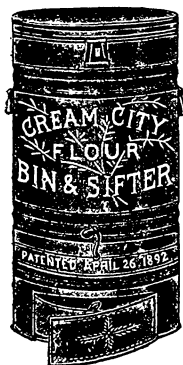


Magnetic Curry Comb.

The comb consists of a plate of magnetic metal, about $\frac{1}{8}$ inch thick, on the under side of which are cone shaped teeth, about $\frac{1}{4}$ inch long, cast on the plate. The comb is provided with a neat wooden handle, and the metal parts of the comb are nickel plated. The manufacturers claim that the comb is absolutely self-cleaning, no dirt or dust adhering to the comb; that it penetrates to the roots of the hair and brings the dirt to the surface; that in connection with a good brush a horse is well cleaned and will thrive on less feed; that it will not cut the hide or skin of an animal, and that should the comb come in contact with the mane or tail it will not pull or draw the hair.

The Cream City Flour Bin and Sifter.

Geuder & Paeschke Mfg. Company, Milwaukee, Wis., are offering a flour bin and sifter, as herewith shown. The



The Cream City Flour Bin and Sifter.

bins are made of tin on improved machinery especially built for their production, handsomely ornamented to make them attractive as well as useful, and each is packed in a separate package, strong enough, it is stated, to insure safe delivery at any distance from the factory. Notable among the features

of the bin is a detachable shield, designed to protect the sifter from pressure by the weight of the flour, but to allow a sufficient quantity to pass through to insure quick and easy sifting, at the same time to obviate all grinding through of foreign substances. The bins are recommended by the makers as of more than ordinary merit, the sale of which will be found satisfactory and profitable.

Gersdorff's Improved Standard Funnel.

J. Hall Rohrman & Co., Philadelphia, Pa., are putting on the market Gersdorff's Standard funnel in an improved form. The improvement consists in the overflow ring, which is now spun on to the top of the funnel, instead of being soldered on, as in the old style. The funnel is made of three pieces of sheet copper or tin, seamed from the top to the center, and soldered from the center to the nozzle, with an overflow ring at the top. The nozzle is shaped triangularly, so that when in use the funnel rests firmly in the neck of a receptacle and makes three perfect vents for the escape of air during the process of filling. The funnel has a strainer so arranged as to be readily removed when required. The makers claim that they can now produce it at a price not exceeding that of an ordinary first-class funnel.

Self Cleaning Filter.

Henry S. Smith, Chadwick, Ill., is offering a self cleaning filter for cisterns, which obviates the use of charcoal and gravel. The filter consists of a rectangular tin box, within which is a cut off, and three wire screens one above the other, the top one coarse, the next one finer and the lower one finer still. At one side of the filter is a conductor pipe, open on the side next the filter, and so arranged that the water can be turned, by the use of the cut off, into the conductor, or caused to pass through the screens into a separate outlet to the cistern. The screens slope somewhat toward the conductor at the side of the filter, to allow the accumulated filth to wash off and be carried to the ground. The cap covering the filter and conductor can be slid up to allow the screens to be removed. On the top of the cap is a collar corresponding in size with the down spout to which the filter is to be connected.

The works of the Morewood Tin Plate Mfg. Company, at Elizabethport, N. J., have been closed down indefinitely, and the workmen discharged. The owners have not yet decided whether the cessation of work in this establishment will be permanent or not. Meanwhile the tin plate works of the Morewood firm at Gas City, Ind., are being actively operated. J. H. Rogers, the head of the Morewood interests, arrived from England last week, and remained in New York for a few days, when he left for Gas City.

Eight of the 12 great 13-inch naval guns destined for the armament of the "Indiana," "Oregon" and "Massachusetts" are completed and awaiting the tests at the Washington ordnance shops, and the remaining four will soon be delivered. These are the largest guns yet made for the navy. None of them have as yet been tested at the

proving grounds, owing to delay in obtaining a trial carriage for such large pieces of ordnance; but the mount will be completed in a few weeks, when the guns will be discharged.

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Current Hardware Prices.

OCTOBER 11, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic.....\$ doz \$2.00, 83%
Excelsior.....\$ doz \$10.00.....50&10&2%
North's.....\$ doz \$11.00.....\$11 net @ 11%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Eagle Anvil, # D 96.....15@15&5%
Fisher Wright's.....11@11%
Armstrong's Mouse Hole.....10%
Am. Wrought Horsehoe Brand 11@11%
Trenton.....10@10%
Wilkinson's.....10%
Moore & Barnes Mfg. Co.....33%
Anvil Vise and Drill—

Millers Falls Co., \$18.00.....20%
Cheney Anvil and Vise.....25%
Allen Anvil and Vise \$3.00.....40&10%
Star.....45&5%

Apple Parers—See Parers Apple, &c.

Augers and Bits—

Common Augers and Bits.....70@70&10%
Boring Machine Augers.....70@70&10%
Car Bits, 12-in. twist.....50%
Russell Jennings' Augers and Bits.....50%
Jennings' Pattern Car Bits.....40%
Jennings' Pattern Auger Bits.....60%
Snell's Bits.....60&5%
C. E. Jennings & Co., No. 10, extension
lip.....40%
C. E. Jennings & Co., No. 30.....50%
C. E. Jennings & Co., Auger Bit set,
32% quaters, No. 5, \$5; No. 30, \$3.50.....50%
Lewis' Patent Single twist.....45%
Pugh's Black.....20%
Pugh's Jennings Pattern.....30%
L'Hommedieu Car Bits.....15&10%
Forster Pat. Auger Bits.....15%
Cincinnati Bell-Hangers' Bits.....30&10

Bit Stock Drills—

Morse Twist Drills.....50&10&5%
Standard.....60&10&5%
Cleveland.....60&10&5%
Syracuse, for metal.....50&10%
Syracuse, for wood (wood list).....30&10&5%
Cincinnati, for wood.....30&10%
Cincinnati, for metal.....45&10%

Expansive Bits—

Clark's small, \$18; large, \$26.....35&35&10%
Ives' No. 4, \$ doz \$60.....40%
Swan's.....40%
Steer's, No. 1, \$26; No. 2, \$18.....35&40%
Stearns' No. 2, \$48.....20%

Gimlet Bits—

Common.....\$ gross \$2.75@3.25
Diamond.....\$ doz \$1.25.....40&10%
Bee.....25&25&5%
Double Cut.....25&25&5%
Shepardson's.....45&45&10%
Cl. Valley Mfg. Co.....40&10%
Hartwell's.....\$ gross \$10.00.....40&10%
Douglass.....40&10%
Ives.....60&60&10%

Hollow Augers—

Ives'.....83%
French, Swift & Co. (Beecher).....\$10%
Douglass.....\$ doz \$48.....50%
Donner's Adjustable, \$ doz \$48.....20&10%
Stearns'.....20&10%
Ives' expansive, each \$4.50.....50&5%
Universal Expansive, each \$4.50.....20%
Wood's.....25&25&10%
Cincinnati Adjustable.....25&25&10%
Cincinnati Standard.....25&25&10%

Ship Augers and Bits—

L'Hommedieu's.....15&10@15&10&5%
Watrous'.....25&25&10%
Snell's.....25&25&10%
Snell's Ship Auger Pat'n Car Bits.....15&10@15&10&5%

Awl Hafts—See Hafts, Awl.

Awls—

Awls, sewing, Common.....\$ gr. 85¢@90¢
Awls, Should. Peg.....\$ gr. \$1.50@1.55
Awls, Pat. Peg.....\$ gr. 35¢@38¢
Awls, Shouldered Brad.....\$ gr. \$1.80@1.40
Awls, Handled Brad.....\$ gr. \$2.50@2.00
Awls, Handled Scratch.....\$ gr. \$4.00@4.50
Awls, Socket Scratch.....\$ doz. \$1.10@1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Plain. Beveled.
First quality, best brands.....\$7.00 \$7.50
First qual., other brands.....6.50 7.00
Second quality.....5.50 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1.....\$4@4%
Nos. 7 to 14.....60&10%
Nos. 15 to 22.....47%
Nos. 19 to 28.....70%
Concord Axles, loose collar.....4%
Concord Axles, solid collar.....5%
National Tubular Self Oiling.....83%
See also Crayons.

Bag Holders—See Holders, Bag.

Balances—

Spring Balances.....40%
No. 2000 20 30
Chatillon, \$ doz.....\$0.80 0.95 1.75 net
Chatillon Straight Balances.....40%
Chatillon Circular Balances.....50&10%

Barb Wire—See Wire, Barb.

Bars—Crow—

Cast Steel.....\$ doz \$3%
Iron, Steel Points.....\$ doz \$8%

Basins, Wash—

Standard Fibreware, No. 1, 10% in., \$1.80;
12-inch, \$2.00; 18% inch, \$2.50; 15-inch,
\$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82.....50&10%
Chatillon's No. 1.....50%
Chatillon's No. 2.....50%
Custer's.....33%

Beaters—Egg—

Dover.....\$ doz \$1.00@1.20
Duplex (Standard Co.).....\$ doz \$1.00
Dover (Standard Co.).....\$ doz \$1.00
Duplex Extra Heavy (Standard Co.).....\$ doz \$3.50
Bryant's.....\$ gross \$14.00
Double (H. & R. Mfg. Co.).....\$ gross, No. 0
\$12.00; No. 1, \$15.00; No. 2.....\$36.00
Easy (H. & R. Mfg. Co.).....\$ doz \$18.50
Triple (H. & R. Mfg. Co.).....\$ gross \$4.25 @ \$4.50
Improved Acme (H. & R. Mfg. Co.).....\$ gross \$9.00
Silver & Co.....\$ doz \$5.50

Cullinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2.....20%

Bells—Cow—

Common Wrought.....60&10%
Western, Sargent's list.....70&10%
Kentucky, "Star".....70&10%
Kentucky, Sargent's list.....70&10%
Kentucky, Taylor's Japanned.....25&10%
Dodge, Genuine Kentucky.....70@70&10%
Texas Star.....50&10@50&10&5%

Door—

Gong, Abbe's.....83%
Gong, Barton's.....40&10%
Gong, Barton's.....40&10%
Crane, Brooks'.....60&10&5%
Crane, Cone's.....20&10%
Crane, Connel's.....20&10%
Lever, Sargent's.....20&10%
Lever, Taylor's Bronzed or Plated.....net
Lever, Taylor's Japanned.....25&10%
Lever, R. & E. Mfg. Co.'s.....50&10&5%
Pull, Brook's.....60&10&5%

Electric—

Wollensak's.....20%
Bigelow & Dowse.....20%

Hand—

Light Brass.....70&10@70&10&5%
Extra Heavy.....70%
White.....35%
Silver Chrome.....35%
Globe Cone's Patent.....25&10&35%

Miscellaneous—

Call.....45&50%
Farm Bells.....\$ doz \$2.50
Steel Alloy Church and School Bells.....40%

Bellows—

Blacksmiths'.....60&10&5@60&10&10%
Molders'.....40&10&50%
Hand Bellows.....40&10&50%

Belt, Rubber—

Common Standard.....75@75&10%
Standard.....70&70&10%
Extra.....60&10&60&10&10%
N.Y.B.&P. Co., Carbon.....60&60&5%
N.Y.B.&P. Co., Diamond.....50&50&5%
N.Y.B.&P. Co., Para.....40&40&5%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters.....15%
Detroit Perfect Tire Bender.....15%
Green River Tire Benders and Upsetters.....20%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.,
see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron.....60&60&10%
Moore's Novelty, Mal. Iron.....50%
Sure Grip Steel Tackle Blocks.....35%
See also Machines, Hotting.

Bolts—Carriage, Machine, &c.—

Com. list June 10, '84.....80&80&5%
Genuine Eagle, Norway, list Oct. '84.....80&80&10%
Eagle, Norway, list Oct. '84.....80&80&10%
Philadelphia, list Oct. 7, '84.....80%
R.B.&W., list Oct. 1, 1890.....80&10%
Machine, list Jan. 1, 1890.....80&10%
Bolt Ends, list Jan. 1, 1890.....80&10%

Door and Shutter—

Cast Iron Barrel, Square, &c.....70&10%
Cast Iron Shutter Bolts.....70&10%
Cast Iron Chain (Sargent's list).....65&10%
Ives' Patent Door Bolts.....60&10@60&10&5%
Wrought Barrel.....70&10@75%
Wrought Square.....70&10@75%
Wrt Shutter, all iron, Stanley's.....60&10&10%
Wrt Shutter, Brass Knob.....50&50&5%
Wrt Shutter, Sargent's list.....60&10%
Wrt Sunk Flush, Sargent's list.....60&10%
Wrt Sunk Flush, Stanley's list.....50&10&5%
Wrt B. K. Flush, Common.....55&10%

Stove and Plow—

Stove.....60&10@60&10&10%
Plow.....60&10&50@60&10&10%
R. B. & W., Plow.....55%

Tire—

Common, list Feb. 28, '83.....65&65&5%
Port Chester Bolt and Nut Company:
Empire list Feb. 28, '83.....65%
Keystone, Philadel., list Oct. '84.....80%
Norway, Phila., list Oct. '84.....75%
American Screw Company:
Norway, Phila., list Oct. 16, '84.....75%
Eagle, Phila., list Oct. 16, '84.....80%
Philadel., list Oct. 16, '84.....80%
Bay State, list Feb. 28, '83.....65%
R. B. & W., Philadel., list Oct. 16, '84.....80%

Borers, Tap—

Common and Ring.....20&10%
Ives' Tap Borer.....33%
Enterprise Mfg. Co.....20%
Clark's.....33%
Clark's.....33%

Borax—

Per doz.....94&104%

Boring Machines—See Machines, Boring.

Box Pins—See Pins, Box.

Boxes, Wagon—

Spiker's Excelsior, 3 in. \$7.50, 4 in.
\$3.50, 5 in. \$13.00, 6 in. \$15.00.....20%

Braces—

American Bit Brace and Tool Co.
Nos. 10, 12, 20.....80&10%
Nos. 11, 21, 24, 27.....70&10%
Nos. 22, 25, 28.....60&10&5%
Nos. 12, 26, 36, 37.....70&10&5%
Amidon:
Barker's Imp'd Plain.....75&10@80%
Barker's Imp. Nickeled.....65&10@70%
Ratchet.....75&10@80%
Eclipse Ratchet.....60%
Globe Jawed.....40&40&10%
Corner Brace.....40&40&10%
Universal, 8 in., \$2.10; 10 in., \$2.25
Buffalo Ball.....\$1.10@1.15
Barber's.....50&10%
Saxton's:
Barker's Imp. Polished.....75&10@80%
Barker's Imp. Nickeled.....65&10@70%
Ratchet, Polished.....50&10@60%
Ratchet, Nickeled.....40&10@50%
Buffalo Ball.....net, \$1.10@1.15
Bartholomew's:
Nos. 25, 27 and 30.....50&10@60&5%
Nos. 11, 118, 119.....\$1.00@1.10
Common Bit American.....50&50&10%
Fray's Genuine Spotted's.....50&50&10%
Fray's Nos. 70 to 120, 81 to 123, 207 to 414
Ives' New Haven Novelty.....70&70&5%
New Haven Ratchet.....60&5@60&10%
Barber's Ratchet.....60&5@60&10%
Barber's.....60&5%
Spotted.....60&5@60&10%
P. S. & W. Co., Peck's Patent.....80%
Rose & Johnson.....50%
Davis Patent.....50&10%

Brackets—

Shelf, plain.....65@70%
Regular list.....60&10@70&10%
Sargent's list.....70@70&10%
Other makes at a wide range of prices.
Bradley Shelf Brackets.....70&10%

Bright Wire Goods—See Wire.

Broilers—

Hemis Self, Inch.....9 10 9x11
Basting.....\$ doz \$4.50 5.50 6.50
New Haven.....50%
Wire Goods.....65&10%
Morgan Odorless.....\$ doz \$12.50
Queen City.....33%

Buckets, Well—

Galvanized—
Hill's.....\$ doz 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad.....\$ doz 14 qt. \$4.25@4.50
Helwig's Flat Iron Band.....\$3.75
Helwig's Wired Top.....\$ doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers, Butcher's.

Butts—

Brass—
Wrought Brass.....80&80&10%
Cast Brass, Tiebout's.....50%
Cast Brass, Fast.....33%
Cast Brass, Loose Joint.....33%&10%

Cast Iron—

Fast Joint, Narrow.....50&10&5@60%
Fast Joint, Broad.....50&10@60%
Loose Joint.....
Loose Joint, Japanned.....
Loose Joint, Cap. with Acorns.....
Mayer's Hinges.....75@75%
Loose Pin, Acorns.....810%
Loose Pin, Acorns, Japanned.....
Loose Pin, Acorns, Japanned,
Plated Tips.....

Wrought Steel—

Fast Joint, Narrow.....
Fast Joint, Lt. Narrow.....
Fast Joint, Broad.....
Loose Joint, Broad.....
Table Butts, Back Flaps, &c.....
Inside Blind, Regular.....
Indide Blind, Light.....
Loose Pin.....
Bronzed Wrought Butts.....50&50&10

Cages, Bird—

Hendryx, Brass or Enameled.....50&10%
Hendryx, Wood.....40&10%

Calipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt.....5%
Burke's One Prong, Blunt.....5%
Burke's Two Prong, Blunt.....7%
Burke's One Prong, Sharp.....6%
Can Openers—See Openers.

Cans, Milk—

S. S. & Co.: 5-gal., \$3.00; 8-gal., \$4.40;
10-gal., \$4.75 each.....40&10

Cans, Oil—

Galvanized Blue Band, 5 gal., Tip-Top,
\$ doz \$12.00
Galvanized Blue Band, 5 gal., Faucet,
\$ doz \$12.25
Galvanized Blue Band, 1 gal., \$ doz \$2.25
Glass Oil, Friend.....\$ doz \$2.75

Caps—

Percussion—
Hicks & Goldmark's and Union Metallic
Cartridge Co.....\$1000
F. L. Waterproof, 1-10's.....35@37%
E. B. Trimmed Edge, 1-10's.....47@50%
E. B. Grind. Edge, Cent. Fire, 1-10's.....47@50%
Musket, Waterproof, 1-10's.....50&53%
G. D.27@30%
S. B. Genuine Imported.....45%
Eley's E. B.....50&58%
Eley's D Waterproof, Central Fire.....\$1.60

Primers—

Berdan Primers, \$1.00.....2%
R. L. Caps (Starvation Shells) \$1.00.....2%
All other Primers, \$1.20.....2%

Cards—

Watson's Cotton, Wool, Horse and
File, list January 28, 1891.....25%

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Rim Fire Cartridges.....50&5&5%
Rim Fire Mills.....2%
Cent. Fire, Pistol and Rifle.....25&25&2%
Cent. Fire, Military and Sporting.....15&5&2%
Blank Cartridges, except 22 and 32 cal.,
additional 10% to above discounts.
Blank Cartridges, 22 cal., \$1.75.....2%
Blank Cartridges, 32 cal., \$3.50.....2%
Primed Shells and Bullets.....15&5&2%
B. B. Caps, Round Ball, \$1.75.....2%
B. B. Caps, Con. Ball, Swgd., \$2.00.....3%

Carpet Sweepers—

See Sweepers, Carpet.

Casters—

Bed.....Brass.....55&55&10%
Plate.....Others.....60&60&10%
Shallow Socket.....40&10%
Deep Socket.....40&10%
Martin's Patent (Phoenix).....45&10@50&10%
Tucker's Patent, low list.....45%
Payson's Anti-friction.....70&70&10%
Payson's Truck.....60&60&10%
Yale Casters, low list.....45%
70 lb. Gem.....35%
Giant Truck Casters.....35%
Stationary Truck Casters.....50&10%
Socket Truck Casters.....50&50&10%
Gwinner's Common Sense.....45%
Gwinner's Hercules.....45%

Cattle Leaders—

See Leaders, Cattle.

Cement—

Victor Elastic.....5 in palls \$ 5¢

Chain—

Trace, Wagon and Fancy Chains,
List revised May, 1893.....60&60&10%
American Coll. in cash lots,
3-16 5-16 7-16 1-4 5-8
\$7.60 5.30 4.40 3.80 3.65 3.50 3.40 3.25
Less than cash lots, add 6%
German Coll. list July 12, 1892.....60&10%
German Halter Chain, list July 12, 1892.....60&60&10%
Covert Halter.....60&5%
Cover Traces.....35&2%
Cover Heel Chain.....50&2%
Galvanized Pump Chain.....\$ 100 lb \$5.50
1-ton lots.....\$ 100 lb \$5.75
500-lb lots.....\$ 100 lb \$8.75
Less than 500 lb.....\$ 100 lb \$7.99
Oneda Halter Chain.....60&60&5%
Jack Chain, Iron and Brass, list July
10, 1893.....60&10%
Barnes' Reinforced Sash.....60&10%
Barnes' Victor Sash.....65%

Chalk—

See also Crayons.
White, case lots, \$ gr 50¢; small lots, 52¢
Red, case lots, \$ gr 67¢; small lots, 72¢
Blue, case lots, \$ gr 75¢; small lots, 80¢

Chalk Lines —See Lines.	
Checks, Door	
Unity	.....50%
Chisels	
Socket Framing and Firmer	
P. S. & W.	.....75%100%75%100%10%
New Haven	.....75%100%75%100%10%
Witherby	.....75%100%75%100%10%
M. I.	.....75%100%75%100%10%
Ohio Tool Co.	.....75%100%75%100%10%
Douglas	.....75%100%75%100%10%
Buck Bros	.....75%100%75%100%10%
Merrill	.....75%100%75%100%10%
L. & I. J. White	.....75%100%75%100%10%
Tanged and Miscellaneous	
Tanged Firmers	.....75%100%75%100%10%
Butchers	.....75%100%75%100%10%
Speck & Jacksons	.....75%100%75%100%10%
Buck Bros	.....75%100%75%100%10%
Cold Chisels, fair quality, P. S. & W.	.....75%100%75%100%10%
Chucks	
Beach Pat.	.....75%100%75%100%10%
Morse's Adjustable, each, \$7.00, 20¢ doz.	.....75%100%75%100%10%
Danbury	.....75%100%75%100%10%
Syracuse, Balz Pat.	.....75%100%75%100%10%
Graham Patent	.....75%100%75%100%10%
Skinner's Patent Chucks	.....75%100%75%100%10%
Combination Lathe Chucks	.....75%100%75%100%10%
Universal Lathe Chucks	.....75%100%75%100%10%
Independent Lathe Chucks	.....75%100%75%100%10%
Drill Chucks	.....75%100%75%100%10%
Union Mfg. Co.	.....75%100%75%100%10%
Victor	.....75%100%75%100%10%
Combination	.....75%100%75%100%10%
Universal	.....75%100%75%100%10%
Independent	.....75%100%75%100%10%
Churns	
Tiffin Union, each, 5 gal. \$3.25; 7 gal., \$3.75; 10 gal., \$4.25.	.....75%100%75%100%10%
McDermid Star Barrel Churn, each 6 gal., \$2.00; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25.	.....75%100%75%100%10%
Clamps	
R. I. Tool Co.'s Wrought Iron	.....75%100%75%100%10%
Adjustable, Cincinnati	.....75%100%75%100%10%
Adjustable, Hammers	.....75%100%75%100%10%
Adjustable, Stearns	.....75%100%75%100%10%
Stearns's Adjustable Cabinet and Corner	.....75%100%75%100%10%
Cabinet, Sargents	.....75%100%75%100%10%
Carriage Makers, Sargents	.....75%100%75%100%10%
Carriage Makers, P. S. & W. Co.	.....75%100%75%100%10%
Eberhard Mfg. Co.	.....75%100%75%100%10%
Warner's	.....75%100%75%100%10%
Saw Clamps, see Vises, Saw Filers	.....75%100%75%100%10%
Carpenter's, Cincinnati	.....75%100%75%100%10%
Barnes' Machinists' Clamps	.....75%100%75%100%10%
Cleavers, Butchers	
Bradley's	.....75%100%75%100%10%
L. & I. J. White	.....75%100%75%100%10%
Beatty's	.....75%100%75%100%10%
New Haven Edge Tool Co.'s	.....75%100%75%100%10%
P. S. & W.	.....75%100%75%100%10%
Foster Bros	.....75%100%75%100%10%
Schulte, Lohoff & Co.	.....75%100%75%100%10%
Clips	
Norway, Axle, 1/4 & 5-16	.....75%100%75%100%10%
2d grade Norway Axle, 1/4 & 5-16	.....75%100%75%100%10%
Superior Axle Clips	.....75%100%75%100%10%
Norway Spring Bar, 1/4 & 5-16	.....75%100%75%100%10%
Wrought Iron Felice Clips	.....75%100%75%100%10%
Steel Felice Clips	.....75%100%75%100%10%
Baker Axle Clips	.....75%100%75%100%10%
Cloth and Netting, Wire	
Cockeys	
Cocks Brass	
Hardware list (Globe, Kerosene, Lever)	.....75%100%75%100%10%
Bibbs, Racking, & Co.	.....75%100%75%100%10%
Coffee Mills —See Mills, Coffee.	
Collars Dog	
Chapman Mfg. Company, new list	.....75%100%75%100%10%
Medford Fancy Goods Co.	.....75%100%75%100%10%
Embossed, Gift, Pope & Stevens	.....75%100%75%100%10%
Leather, Pope & Stevens's list	.....75%100%75%100%10%
Brass, Pope & Stevens's list	.....75%100%75%100%10%
Combs, Curry	
Fitch's	.....75%100%75%100%10%
Rubber, per doz.	.....75%100%75%100%10%
American Curry Comb Co.	.....75%100%75%100%10%
Kohler's Magic Oscillating	.....75%100%75%100%10%
Kohler's Humane	.....75%100%75%100%10%
Compasses, Dividers, &c.	
Compasses, Calipers, Dividers	.....75%100%75%100%10%
Bemis & Call Co.'s	.....75%100%75%100%10%
Dividers	.....75%100%75%100%10%
Compasses	.....75%100%75%100%10%
Calipers, Inside or Outside	.....75%100%75%100%10%
Calipers, Wing	.....75%100%75%100%10%
Calipers, Double	.....75%100%75%100%10%
Calipers, Call's Patent Inside	.....75%100%75%100%10%
Excelsior	.....75%100%75%100%10%
Stevens & Co.'s	.....75%100%75%100%10%
Starrett's	.....75%100%75%100%10%
Spring Calipers and Dividers	.....75%100%75%100%10%
Lock Calipers and Dividers	.....75%100%75%100%10%
Combination Dividers	.....75%100%75%100%10%
Coopers' Tools	
S. S. & Co. 2 gal., \$2.00; 3 gal., \$2.50; 4 gal., \$2.75; 6 gal., \$3.40 each	.....75%100%75%100%10%
Coopers' Tools —See Tools, Coopers.	
Cord	
Sash	
Common	.....75%100%75%100%10%
Patent, good quality	.....75%100%75%100%10%
White Cotton Braided, fair	.....75%100%75%100%10%
Common Russia Sash	.....75%100%75%100%10%
Patent Russia Sash	.....75%100%75%100%10%
Cable Laid Italian Sash	.....75%100%75%100%10%
India Cable Laid Sash	.....75%100%75%100%10%
Silver Lake	.....75%100%75%100%10%
A quality, White, 50¢	.....75%100%75%100%10%
A quality, Drab, 50¢	.....75%100%75%100%10%
B quality, White, 30¢	.....75%100%75%100%10%
B quality, Drab, 30¢	.....75%100%75%100%10%
Sylvan Spring, Extra Braided, White	.....75%100%75%100%10%
Sylvan Spring, Extra Braided, Drab	.....75%100%75%100%10%
Semper Idem, Braided, White	.....75%100%75%100%10%
Egyptian, India Hemp, Braided	.....75%100%75%100%10%
Massachusetts, White	.....75%100%75%100%10%
Samson	.....75%100%75%100%10%
Braided, White Cotton	.....75%100%75%100%10%
Braided, Drab Cotton	.....75%100%75%100%10%
Braided, Italian Hemp	.....75%100%75%100%10%
Braided, Linen	.....75%100%75%100%10%
Tate's Solid Braided	.....75%100%75%100%10%
Hercules, White	.....75%100%75%100%10%
Hercules, Drab	.....75%100%75%100%10%
Economy, White	.....75%100%75%100%10%
Economy, White	.....75%100%75%100%10%
Osgood Mills	.....75%100%75%100%10%
Braided, Giant, White, P. S. & W.	.....75%100%75%100%10%
Braided, Giant, Drab and Fancy	.....75%100%75%100%10%
B 25¢	.....75%100%75%100%10%
Braided, Crown White, P. S. & W.	
Braided, Crown Drab and Fancy, P. S. & W.	
Wire Picture	
Braided or Twisted	.....75%100%75%100%10%
Corkscrews —See Screws, Cork.	
Corn Knives and Cutters	
Crackers Nut	
Table (H. & B. Mfg. Co.)	.....75%100%75%100%10%
Blake's Pattern, P. S. & W.	.....75%100%75%100%10%
Turner & Seymour Mfg. Co.	.....75%100%75%100%10%
Acme	.....75%100%75%100%10%
Japanned, P. S. & W.	.....75%100%75%100%10%
Nickel Plated, P. S. & W.	.....75%100%75%100%10%
Cradles	
Grain	.....75%100%75%100%10%
Crays	
White Crays, P. S. & W.	.....75%100%75%100%10%
D. M. Stewart Mfg. Co.	.....75%100%75%100%10%
Metal Workers' P. S. & W.	.....75%100%75%100%10%
Rolling Mill, P. S. & W.	.....75%100%75%100%10%
Railroad, P. S. & W.	.....75%100%75%100%10%
Soapstone Pencils, P. S. & W.	.....75%100%75%100%10%
See also Chalk	.....75%100%75%100%10%
Creamery Pails —See Pails, Creamery.	
Crow Bars —See Bars, Crow.	
Curry Combs	
Curtain Pins	
Cutters	
Meat	
Dixon's, P. S. & W.	.....75%100%75%100%10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	.....75%100%75%100%10%
Woodruff's, P. S. & W.	.....75%100%75%100%10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	.....75%100%75%100%10%
Hale's, P. S. & W.	.....75%100%75%100%10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	.....75%100%75%100%10%
American	.....75%100%75%100%10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	.....75%100%75%100%10%
Enterprise	.....75%100%75%100%10%
Each	.....75%100%75%100%10%
Little Giant, P. S. & W.	.....75%100%75%100%10%
Nos. 305 310 312 320 322	.....75%100%75%100%10%
Triumph No. 505, P. S. & W.	.....75%100%75%100%10%
Miller's Challenge, P. S. & W.	.....75%100%75%100%10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	.....75%100%75%100%10%
Home No. 1, P. S. & W.	.....75%100%75%100%10%
Draw Cut, each	.....75%100%75%100%10%
Nos. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	.....75%100%75%100%10%
Beef Shavers (Enterprise)	.....75%100%75%100%10%
Chadborn's Smoked Beef Cutter, P. S. & W.	.....75%100%75%100%10%
Slaw and Kraut	
Tucker & Dorsey Mfg. Co.	.....75%100%75%100%10%
Slaw Cutters, 1 Knife, P. S. & W.	.....75%100%75%100%10%
Slaw Cutters, 2 Knife, P. S. & W.	.....75%100%75%100%10%
Kraut Cutters	.....75%100%75%100%10%
Tobacco	
Champion	.....75%100%75%100%10%
All Iron	.....75%100%75%100%10%
Nashua Lock Co.'s	.....75%100%75%100%10%
Wilson's	.....75%100%75%100%10%
Sargents	.....75%100%75%100%10%
Acme	.....75%100%75%100%10%
Washer	
Smith's Pat.	.....75%100%75%100%10%
Johnson's	.....75%100%75%100%10%
Penny's	.....75%100%75%100%10%
Appleton's	.....75%100%75%100%10%
Bonney's	.....75%100%75%100%10%
Cincinnati	.....75%100%75%100%10%
Diggers, Post Hole, &c.	
Samson	.....75%100%75%100%10%
Fletcher Post Hole Augers, P. S. & W.	.....75%100%75%100%10%
Eureka Diggers	.....75%100%75%100%10%
Vaughan's Post Hole Auger, P. S. & W.	.....75%100%75%100%10%
Kohler's Little Giant	.....75%100%75%100%10%
Kohler's Hercules	.....75%100%75%100%10%
Kohler's Invincible	.....75%100%75%100%10%
Kohler's New Champion	.....75%100%75%100%10%
Schneider	.....75%100%75%100%10%
Cronk's Post Bars	.....75%100%75%100%10%
Gibbs' Post Hole Digger	.....75%100%75%100%10%
Gibbs' National	.....75%100%75%100%10%
Gibbs' Columbia	.....75%100%75%100%10%
Gibbs' Imperial	.....75%100%75%100%10%
Shimer's Hollow Handle	.....75%100%75%100%10%
Gem, Improved	.....75%100%75%100%10%
Dividers —See Compasses.	
Dog Collars —See Collars, Dog.	
Door Checks	
Door Springs	
Drawers	
Money, P. S. & W.	.....75%100%75%100%10%
Waddell's Improved	.....75%100%75%100%10%
Drawing Knives	
Drills and Drill Stocks	
Blacksmiths	.....75%100%75%100%10%
Blacksmiths' Self-Feeding, each \$7.50, 20¢	.....75%100%75%100%10%
Preast, P. S. & W.	.....75%100%75%100%10%
Preast, Wilson's	.....75%100%75%100%10%
Preast, Millers Falls	.....75%100%75%100%10%
Preast, Bartholomew's	.....75%100%75%100%10%
Ratchet, Merrill's	.....75%100%75%100%10%
Ratchet, Parker's	.....75%100%75%100%10%
Ratchet, Whitney's	.....75%100%75%100%10%
Ratchet, Weston's	.....75%100%75%100%10%
Ratchet, Moore's Triple Action	.....75%100%75%100%10%
Ratchet, Curtis & Curtis	.....75%100%75%100%10%
Whitneys Hand Drill, Plain	.....75%100%75%100%10%
Adjustable	.....75%100%75%100%10%
Automatic Boring Tools	.....75%100%75%100%10%
Chicopee Automatic Drill	.....75%100%75%100%10%
Goodell Automatic Drills	.....75%100%75%100%10%
Twist Drills	
Cleveland	.....75%100%75%100%10%
Diamond, V. & B.	.....75%100%75%100%10%
Graham's Pat. Groove Shank	.....75%100%75%100%10%
Morse	.....75%100%75%100%10%
New Process	.....75%100%75%100%10%
Standard	.....75%100%75%100%10%
Syracuse (Metal list)	.....75%100%75%100%10%
Drill Bits or Bit Stock	
Drills —See Augers and Bits.	
Drill Chucks —See Chucks.	
Dripping Pans	
Drivers, Screw	
Douglas Mfg. Co.	.....75%100%75%100%10%
Dickson's	.....75%100%75%100%10%
Buck Bros	.....75%100%75%100%10%
Stanley R. & L. Co.'s	.....75%100%75%100%10%
No. 64, Varnished Handles	.....75%100%75%100%1

Halters—

Cover's Rope, Jute, 50x10x10x25
 Cover's Rope, 7-12 in. 70x25
 Cover's Rope, 14 in. Hemp, 50x25
 Cover's Adj. Rope Halters, 40x25
 Cover's Hemp Horse and Cattle Tie, 50x10x25

Cover's Jute Horse Ties, 70x25
 Cover's Jute Cattle Ties, 70x25
 Cover's Adj. Web Halters, 35x25
 Cover's Saddlery Works Halters, 38x15
 Cover's Saddlery Works Horse and Cattle Ties, 38x15
 Cover's Saddlery Works Handy Web Halters, 33x15

Hammers—

Handled Hammers—
 Maydole's, list Dec. 1, '85, 25x10x35x
 Buffalo Hammer Co., 50x10x
 Humason & Beckley, 50x10x
 Atha Tool Co., 40x10x
 Verree, 40x10x
 C. Hammond & Son, 40x10x
 Fayette R. Lamb, 40x10x
 Artisan's, A. E. Nail, 40x10x
 Regular V. & P. A. E. Nail, 50x
 Horseshoe Turning Hammers, 50x10x
 Other Hammers, 50x10x
 Cheney's Claw, 40x10x
 Cheney's Machinist's & Riveting, 50x25
 Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 2.00
 Nelson Tool Works, 40x10x
 Warner & Nobles, new list, 23x10
 Peck, Stow & Wilcox, 35x40
 Sargent's, 40x40x10x

Heavy Hammers and Sledges—

3 lb and under, 75x10x75x10
 3 to 5 lb, 75x10x75x10
 Over 5 lb, 75x10x75x10
 Wilkinson's Smiths, 10x10x11x10

Handcuffs and Leg Irons—

See Police Goods.

Handles—

Cross Cut Saw Handles—
 Atkins' new list, 40x
 Champion, 15x
 Ely's Perfection, 40x
 Sensible, 40x

Iron, Wrought or Cast—

Door or Thumb, 75x10x75x10
 Nos. 1, 2, 3, 1.00, 1.25, 1.50
 Per doz., \$0.90 1.00 1.25 1.50
 Roggin's Latches, 30x30x35x
 Bronze Iron Drop Latches, 70x70 net
 Jav'd Store Door Handles, Nos. 1, 2, 3, 1.10, no plate, \$0.88, net
 Barn Door, 70x14.40, 10x10x
 Chest and Lifting, 70x70x10x

Wood—

Saw and Plane, 40x10x60x
 Hammer, Hatchet, Axe, &c., 40x40x25x
 Bradawl, 40x
 Hickory Firmer Chisel, ass'd, 40x4.50
 Hickory Firmer Chisel, large, 40x5.00
 Apple Firmer Chisel, ass'd, 40x5.00
 Apple Firmer Chisel, large, 40x6.00
 Socket Firmer Chisel, ass'd, 40x3.00
 Socket Framing Chisel, ass'd, 40x5.00
 J. B. Smith & Co.'s Pat. File, 50x
 File, assorted, 40x2.75
 Auger, assorted, 40x6.00
 Auger, large, 40x7.00
 Pat. Auger, 30x10x
 Pat. Auger, Douglass, 30x12.25
 Pat. Auger, Swan's, 30x11.00
 Hoe, Rake, shovel, &c., 60x60x25x

Hangers—

Barn Door, old patterns, 70x70x25x
 Barn Door, New England, 70x70x25x
 Samson Steel Anti-Friction, 55x
 Orleans Steel, 55x
 Hamilton Wrought Steel Track, 55x
 Champion, 60x10x
 Climax Anti-Friction, 55x
 Zenith for Wood Track, 50x10x60x
 Sterling, 50x10x60x
 Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00
 Kiddier's, 50x50x10x
 Boss, 60x10x60x10x25x
 Best Anti-Friction, 60x10x60x10x25x
 Duplex (Wood Track), 60x10x60x10x25x
 Terry's Modern, 50x10x60x10x25x
 Terry's Ideal, 50x10x60x10x25x
 Terry's Solid, 50x10x60x
 Terry's Shield, 50x10x60x
 Terry's Wrought Single Strap, 60x10x
 Cronk's Patent, Steel Covered, 60x10x
 Carrier Steel Anti-Friction, 60x10x
 Richards, 30x30x10x
 Lane's New Standard, 50x50x10x
 Lane's Standard, 50x50x10x
 Lane's Parlor, 40x
 Warner's Pat., 20x10x10x
 Stearns' Anti-Friction, 20x10x10x
 Stearns' Challenge, 25x10x10x
 Cincinnati Nos. 1, \$2.25; 3, \$2.50; 4, \$2.50
 Paragon Nos. 5, 6, 7 and 8, 20x10x
 Crescent, 60x60x10x
 Nickel, Steel, Nos. 0, \$2.50; 1, \$2.00; 2, \$1.50
 Chicago Anti-Friction, 40x10x60x
 Star, 30x10x
 Barry, 50x
 Interstate, 50x10x60x
 Pendulum, Payson's, 40x40x10x
 Moody, 45x
 Economy, \$6.00, 50x10x
 Perfection, 50x10x60x10x25x
 Lundy Steel Parlor, 50x10x
 Matchless, 50x10x
 Magie, 45x10x
 Wild West, 45x10x
 Moore's Elevator, 33x15
 Moore's Baggage Car Door, 33x15
 Moore's Railroad, 55x

Harness Snaps—See Snaps.**Hatchets—**

American Axe and Tool Co., 40 & 10
 Blood's, 40 & 10
 Hunt's, 40 & 10
 Hurd's, 40 & 10
 Mann's, 40 & 10
 Peck's, 40 & 10
 Underhill's, 40 & 10
 Fayette R. Plumb, 40 & 10
 C. Hammond & Son, 40 & 10
 Kelly's, 50 @ 50
 Buffalo Hammer Co., 50 @ 50
 Sargent's & Co., 50 @ 10
 P. S. & W. Co., 50 @ 10
 Schulte, Lohoff & Co., 50 @ 10
 Ten Eyck Edge Tool Co., 50 @ 10
 Collins, 10x

Hay and Straw Knives**See Knives.****Hinges—****Blind Hinges—**

Parker, 75x75x10x
 Ruffer, 60x
 Clark's Nos. 1, 3, 5, 40 and 60, 80x50x80x10x
 Clark's Mortise Gravity, 60x
 Sargent's Nos. 1, 3, 5, 11, 12, 13, 75x75x10x
 Reading's Gravity, 75x10x75x10x25x
 Shepard's, 75x10x
 Niagara, 80x
 Buffalo, 80x
 Clark's Genuine Pattern, 80x
 O. S. Lull & Porter, 75x10x
 Acme, Lull & Porter, 75x10x
 Queen City Reversible, 70x10x25x75x
 Clark's Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3, 75x10x25x
 North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50, 60x60x10x

Gate Hinges—

Western, 60x60x10x
 N. E., 60x7.80, 60x60x10x
 N. E. Reversible, 60x60x10x
 Clark's, Nos. 1, 2, 3, 60x10x25x
 N. Y. State, 40x4.90, 60x60x10x
 Automatic, 60x12.50, 50x
 Shepard's, 60x10x25x

Spring Hinges—

Geer's Spring and Blank Butts, 40x
 Union Spring Hinge Co.'s list, 20x
 March, 1886, 20x
 Barker's Double Acting, 25x
 Union Mfg. Co., 25x
 Bommer's Japanese, 20x
 Bommer's All other Kinds, 30x
 Buckman's, 15x20x
 Chicago, 30x
 Bardsley's Patent Checking, 15x
 Acme, 30x
 U. S., 25x10x
 Empire and Crown, 20x
 Hero and Monarch, 55x
 American, Gem and Star, 20x
 Oxford, 20x
 Royal, 60x25x
 Reliable, 60x
 Champion, 60x
 No. 10 Matchless, 60x
 No. 25 Unbreakable, 60x
 J. G. C. Covered, 60x30, 60x25x
 Samson, 60x60x7 1/2x
 Wiles, No. 1, 60x, \$16; No. 2, \$13
 Devore, No. 1, 60x, \$13.00
 Rex, 60x, \$13.00
 Freeport, 60x, \$13.00
 New Idea Nos. 1 and 10, 60x, \$13.00
 New Idea Dbl. Acting, 45x
 Ideal No. 3, 60x, \$10.00
 Stearns' Noiseless Floor Hinge, 60x, \$5.00, 20x10x30x

Wrought Iron Hinges—

List February 14, 1891.
 Strap and T., 50x10x50x10x10x
 Corrugated Strap and T., 50x10x25x
 Screw Hook and T., 6 to 12 in., 4x
 Strap, 14 to 20 in., 4x
 Strap, 22 to 36 in., 4x
 Screw Hook and Eye, 1/2 in., 4x
 Rolled Blind Hinges, Nos. 32 and 34, 50x10x
 Rolled Blind Hinges, Nos. 252 and 254, 50x10x
 Rolled Plates, 70x10x
 Rolled Raised, 70x10x
 Plate Hinges (8, 10 & 12 in., 4x
 "Providence" over 12 in., 4x

Hoes—

D. & H. Scovill, 20x
 Lane's Crescent, Planters' Pattern, 45x25x
 Lane's Razor Blade, Scovill Pattern, 30x
 Maynard, S. & O. Pat., 45x25x
 Sandusky Tool Co., S. & O. Pat., 60x5
 Am. Axe and Tool Co., S. & O., 60x10x
 Chattanooga Tool Co., S. & O. Pat., 60x
 Grub, 60x10x

Handled—

Garden, Mortar, &c., 70x70x5x25x
 Planter's, Cotton, &c., 70x70x5x25x
 Warren Hoe, 60x60x25x
 Magic, 60x24.00

Hog Rings and Ringers—**See Rings and Ringers—****Holisting Apparatus—****See Machines, Holisting.****Hollow-Ware—****See Ware, Hollow.****Holders—****Bag—**

Sprengle's Pat., 40x18, 60x

Bit—

Extension, 40x10x10x
 Barber's, 40x15.00, 40x10x10x
 Res, 40x20.00, 40x10x10x
 Diagonal, 40x24.00, 40x
 Angular, 40x24.00, 40x25x

File and Tool—

Bals Pat., 40x4.00, 25x
 Nicholson File Holders, 20x

Sash—

Motley's Adj. Sash, Medium Size, 40x
 40x1.20, 40x

Hooks—**Cast Iron—**

Bird Cage, Sargent's List, 60x10x10x
 Bird Cage, Reading, 60x10x10x
 Clothes Line, Sargent's list, 60x10x10x
 Clothes Line Moore's, 70x

Line, Reading list.

Ceiling, Sargent's list, 55x10x10x
 Harness, Reading list, 55x10x10x
 Coat and Hat, Sargent's list, 55x10x60x10x

Coat and Hat, Reading, 50x10x50x10x10x
 Coat and Hat, Moore's, 70x

Wrought Iron—

Cotton, 40x11.25
 Cotton Pat. (N. Y. Mallet and Handle), 30x
 Tassel and Picture, T. & S. Mfg. Co., 50x
 Wrought Staples Hooks, &c., 50x
 See Wrought Goods

Wire—

Wire Coat and Hat, Gem, list April, 1886, 60x60x10x
 Wire Coat and Hat, Miles, list April, 1886, 50x50x10x
 Indestructible Coat and Hat, 45x45x5x
 Wire Coat and Hat, Standard, 60x60x10x
 Handy Hat and Coat, 50x10x60x
 Steady Ceiling Hooks, 80x15x80x20x
 Atlas, Coat and Hat, 65x
 Williamson's Bird Cage Hooks, list April, 1892, 40x
 Bright Wire Goods—See Wire.

Miscellaneous—

Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25
 Noll's Grass, 40x12.25
 Bush, 60x
 Whitmore—Patent, 55x
 Hooks and Eyes—Malleable Iron, 70x70x10x
 Fish Hooks, American, 60x10x10x
 Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse**Horse Shoes—****See Shoes, Horse.****Hose, Rubber—**

Competition, Fair quality, 75x75x10x
 Competition, Low Grade, 80x80x10x
 Standard, 70x10x70x10x5x
 Extra, 60x10x60x10x10x
 N. Y. B. & F. Co., Para, 25x5x
 N. Y. B. & F. Co., Extra, 40x25x5x
 N. Y. B. & P. Co., Dundee, 60x60x5x
 Cotton Garden, 4 in., coupled: 7x
 Fair Quality, 7x
 Good Quality, 8x4x

Huskers—

Blair's Adjustable, 60x8.00
 Blair's Adjustable Clipper, 60x7.00
 Hubbard's Solid Steel, 60x4.50

Indurated Fiber Ware—**See Ware, Indurated Fiber.****Irons.**

From 4 to 10, at factory, 100 lb, \$2.30x\$2.40
 Self-Heating, 60x8.00
 Self-Heating Tailors', 60x18.00
 Mrs. Potts' Sad Irons, per set: 60
 No. 1, 55 65
 No. 2, 90 85 1.05 95
 Crown Improved, 60x10x
 Ideal Irons, new list, 60x10x50x10x10x
 Salamander Irons, 25x
 B. B. Sad Irons, 30x34x
 Chinese Laundry (N.E. Butt Co.), 34x, 15x
 New England, 5x, 20x20x5x
 Mahony's Troy Pol. Irons, 50x10x5x
 Sensible, list Jan. 91, 50x10x5x
 Sensible Tailors' Irons, 33x5x
 National Self-Heating, 30x

Soldering—

Soldering Coppers, 19x21x
 Cover's Adjustable, list Jan. 1, 1886, 35x2x
 Tinker's Dread, 40x1.75; 60x, 1.18

Pinking—

Pinking Irons, 55x60x.

Jack Screws—See Screws.**Jacks, Wagon—**

Daisy, 33x4x
 Victor, 33x4x
 Lockport, 40x

Kettles—

Brass, Spun, Plain, list Jan. 1, '91, 25x5x
 Brass, Cabinet, &c., 33x5x25x
 Hotchkiss' Brass Blanks, 40x
 Hotchkiss' Copper and Tinned, 40x
 Hotchkiss' Pad. and Cab., 35x
 Wollensak Tinned, 50x10x

Keys—

Lock, Ass'n list Dec. 30, 1886, 65x10x70x
 Eagle, Cabinet, &c., 33x5x25x
 Hotchkiss' Brass Blanks, 40x
 Hotchkiss' Copper and Tinned, 40x
 Hotchkiss' Pad. and Cab., 35x
 Wollensak Tinned, 50x10x

Knife Sharpeners—**See Sharpeners, Knife.****Knives—**

Butcher, Shoe, &c.
 Wilson's Butcher Knives, list Dec. 8, 1890, 25x
 Ames' Butcher Knives, 25x
 Foster Bros' Butcher, &c., 40x
 Jordan's A.A. Butchers', list, 40x10x
 Nichols' Butcher Knives, 40x10x
 W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.50, &c.
 Ames' Shoe Knives, 25x30x
 Ames' Bread Knives, 40x1.50, 15x20x
 Moran's Shoe and Bread, 20x20x10x
 Hay and Straw—See Hay Knives.
 Table and Pocket—See Cutlery.

Corn—

Bradley's, 10x
 Wadsworth's, 25x25x10x

Drawing—

Wetherby, 75x75x10x5x
 F. S. & W., 75x75x10x5x
 New Haven, 60x10x60x10x25x
 Merrill, 60x10x60x10x25x
 Douglass, 75x75x10x25x
 Watrous, 15x10x25x

L. & I. J. White, 20x5x

Bradley's, 35x
 Adjustable Handle, 25x33x
 Wilkinson's Folding, 25x25x5x

Hay and Straw—

Lighting, from jobbers, \$8.00x\$9.00
 Wadsworth's, 40x10x40x10x
 Carter's Needle, 40x11.00x\$11.50
 Heath's, 40x13.00x\$3.50
 Noll's Hay, 40x7.00x\$8.00

Mincing—

Am. (2d quality), 1 gr., 1 blade, \$7
 2 blades, \$12; 3 blades, \$18, 20x10x
 Lotthrop's, 40x10x
 Smith's, 40x, Single, \$2; Double \$3
 Knapp & Cowles, 50x10x60x
 Buffalo Adjustable, 40x3.00, 33x4x

Knobs—

Door, Mineral, 60x65x
 Door, Por. Jap'd, 70x75x
 Door, Por. Nickel, 2.00x\$2.25
 Door, Por. Plated Nickel, 2.00x\$2.25
 Drawer, Porcelain, 80x10x60x10x
 Hemacite Door Knobs, 40x10x50x
 Yale & Towne Wood, list Dec., 1885, 4.00x
 Base, Rubber Tip, 70x10x5x
 Square, Jap'd, 60x10x10x70x
 Picture, Sargent's, 70x10x
 Picture, Hemacite, 35x5x
 Shutter, Porcelain, 65x10x
 Carriage, Jap., 80x, 60x10x
 Bardsley's Wood Door, Shutter, &c., 15x

Ladders.

Davies Extension and Single, 20x5x

Ladies—

Melting, Sargent's, 60x60x5x
 Melting, Reading, 35x12x
 Melting, P. S. & W., 35x10x40x
 Melting, Warner's, 30x

Lanterns—**Tubular—**

Regular, with Guard, 40x3.50
 O. K., with Guard, 40x3.75
 Side Lift, with Guard, 40x4.00
 Square Lift, with Guard, 40x4.25
 Anti-Friction, with Guard, 40x4.50
 Brass Plated, Sq. Lift, Guard, 40x5.50
 Cop. Plated, Sq. Lift, Guard, 40x5.50

Bull's Eye Police—

2 1/2-inch regular, 40x3.60
 3-inch regular, 40x3.60
 2 1/2-inch flash light, 40x4.00
 3-inch flash light, 40x4.50

Lawn Mowers—**See Mowers, Lawn.****Leaders, Cattle—**

Humason, Beckley & Co.'s, 70x
 Sargent's, 70x10x70x10x10x
 Hotchkiss, 30x
 Peck, Stow & W. Co., 60x10x

Lemon Squeezers—**See Squeezers, Lemon.****Lifters, Transom—**

Wollensak's:
 Class 3 and 4, Bronzed Iron, 60x
 Class 3 and 4, Bronze Metal, 50x
 Class 3 and 4, Brass, 60x
 Skylight Lifters, 35x
 Reith's, list Feb. 20, 1891, 60x60x10x
 Bronzed Iron Rods, 30x
 Excelsior, 50x10x25x
 Shaw's, 50x10x
 Parson's:
 Universal, 60x
 Solid Grip, 60x10x60x10x10x
 Imperial, 50x10x

Lines—

Cotton and Linen Fish, 50x
 Chalk, 60x
 Mason's Linen, 8 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25
 Cotton Chalk, 55x
 Samson Cotton, No. 4, \$2; No. 4 1/2, \$2.50
 Silver Lake, Braided No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50
 Mason's Linen, No. 2 1/2, \$1.50; No. 3, \$2.00; No. 4 1/2, \$2.50
 Mason's Colored Cotton, 45x
 Wire Clothes, Nos. 18 19 20
 100 ft., \$5.50 \$3.00 \$2.50
 Ventilator, Cord, Samson, Braided
 White or Drab Cotton, 40x7.50, 20x
 Ossawan Mills, Chalk, Twisted, 60x
 Chalk, Soft Braided, 50x Chalk, Braided, 25x

Links, Open—

Terry's—per gro.:
 Nos. 2 3 4
 \$6.00 8.00 12.00 16.00

Locks, &c.—**Cabinet—**

Eagle, Gaylord Par. List, March '84, rev

Britain, Graham & Mathes, list Jan. 1890.....60&10&10%
 Plate.....33&22%
 Barnes Mfg. Co.....40&40&10%
 Yale.....net prices
 Deitz Flat Key.....30%
 Romer's Night Latches.....15%
 Brooklyn Latches.....50&10%
 Warner's Burglar Proof, # doz. \$8.00, 50%
 Moore's.....33&4%

Elevator—

Padlocks—

List June 10, 1891.....50&2%
 Norwich Lock Mfg. Co., old list.....50&2%
 Yale Lock Mfg. Co.'s.....net prices
 Eagle.....40%
 Eureka, Eagle Lock Co.....40&2%
 Romer's Nos. 0 to 91.....30%
 Romer's Scandinavian, &c., Nos. 100 to 505.....15%
 A. E. Deitz.....40%
 Champion Padlocks.....40%
 Hotchkiss.....30%
 Star.....60%
 Horseshoe.....# doz \$9.50 to \$10%
 Barnes Mfg. Co.....40&40&10%
 Nock's.....30%
 Scandinavian.....60&40%
 E. T. Frahm's Keystone Scandinavian.....9&40%
 1010 line.....9&40%
 120 line.....90&25%
 109 line.....65%
 510 line.....70&10%
 225, 610 and 209 lines.....70%
 All other numbers.....50&5%
 Ames sword Co. No. 150.....40%
 Ames sword Co. above No. 150.....50%
 Slaymaker, Barry & Co.
 No. 1010 line.....90&5%
 No. 41 line.....60%
 No. 81 line.....60%
 No. 21 line.....50%

Sash, &c.—

Clark's No. 1, \$10; No. 2, \$8 gr.....33&4%
 Ferguson's.....33&4%
 Victor.....60&10&2%
 Walker's.....10%
 Attwell Mfg. Co.....25&35%
 Reading.....60&10&2%
 Hammond's Window Springs.....40%
 Common Sense, Jap'd, Cop'd and Br'd.....gr \$4.00
 Common Sense, Nickel Plated.....gr \$10.00
 Universal.....30%
 Kempshall's Gravity.....60%
 Kempshall's Model.....60&60&10%
 Corbin's Daisy, list Feb. 15, 1886.....70%
 Payson's Perfect.....60&10&10%
 Huginin's Sash Balances.....25&25%
 Huginin's New Sash Lock.....25&25%
 Ives' Patent.....60&10&2%
 Fish (Liesche's pat.), No. 100, gr. \$3; No. 105, gr. \$10.....50%
 Davis Bronze, Barnes Mfg. Co.....60%
 Champion Safety list January, 1893.....70&5%
 Security.....70%
 Grant, list Jan., 1892.....70&5%
 Wolcott's.....60&10&2%
 Monarch.....50%

Lumber Tools—

See Tools, Lumber.

Lustro—

Four-ounce bottles.....# doz. \$1.75; # gross.....\$17.00

Machines.

Boring—

Without Augers. Upright. Angular.
 Douglas.....\$5.50 \$6.75
 Snell's, Rice's Pat., 5.50 6.75 40&10&10%
 Jennings'.....6.50 6.75 60&60&5%
 Other Machines.....2.25 2.50
 Phillip's Patent with Augur.....7.00 7.50
 Millers Falls.....7.50
 Boss, Carpenters' 3.60
 Boss, Ship Bldrs' 3.85

Fluting—

Knox, 4 1/2-inch Rolls.....\$3.25 each 35%
 Knox, 6-inch Rolls.....\$3.60 each 35%
 Eagle, 8 1/2-inch Rolls.....\$2.15.....35%
 Eagle, 6 1/2-inch Rolls.....\$2.85.....35%
 Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$5.00 each.....35%
 Crown Jewel, 6 in.....\$3.50 each, 35%
 American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....35%
 Domestic Fluter.....each, \$1.50
 Geneva Hand Fluter, White Metal, # doz \$12.25
 Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25.....30%
 Shepard Hand Fluter, No. 85, per doz \$15.50.....40%
 Shepard Hand Fluter, No. 110, # doz \$11.00.....40%
 Shepard Hand Fluter, No. 95, # doz \$3.00.....40%
 Combined Fluter and Sad Iron.....# doz \$15.00.....30%

Holting—

Moore's Hand Holst, with Lock Brake.....20%
 Moore's Anti-Friction Differential Pulley Block.....20%
 Moore's Rope Differential Pulley Block.....60%
 Energy Mfg. Co.'s.....25%
 See also Blocks.

Washing—

Anthony Wayne, # doz. No. 1, \$42; No. 2, & 3, \$42.....# doz \$38.00
 Wayne American.....# doz \$42.00
 Western Star, # doz. No. 2, \$36; No. 3 \$30
 Weissell.....# doz \$54.00
 Fair and Square.....# doz \$42.00

Mallets—

Hickory.....20&10&20&10&10%
 Lignumvita.....20&10&20&10&10%
 B. & L. Block Co., Hickory & L. V.....30&30&10%
 Mattocks—Regular list.....60&10&60&10&5%

Measures—

Standard Fireware, No. 1, peck # dozen, \$3.50; 1/2 peck, \$3.00
 Meat Cutters—See Cutters, Meat.
 Menders, Harness—Per doz.....\$2.00
 Milk Cans—See Cans, Milk.

Mills—

Coffee—

Box and Side, list Jan. 1, 1888.....60&60&5%
 Net prices are often made which are lower than above discount.
 American, Enterprise Mfg. Co., list Jan. 17, 1893.....20%
 The Swift, Lane Bros.....30%
 Vaddell's New Box Mills, Ideal Brand, New List.....60%

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Best Machines: 10-in., \$4; 12-in., \$4.50; 14-in., \$5; 16-in., \$5.50; 18-in., \$6.
 Low-Grade Machines: 10-in., \$3; 12-in., \$3.25 14-in., \$3.50 each

Muzzles—

Safety.....# doz. \$3.00, 25%

Nails—

Cut and Wire. See Trade Report.
 Wire Nails, Papered.
 Association list, May 1, '92.....85&5%
 Tack Mfrs' list.....70&5%
 Hungarian, Finishing, Upholsterers' &c. See Tacks.

Horse—

Nos. 6 8 9 10
 American.....9 1/2 9 1/4 9 1/8 9 1/4.....net
 Ausable.....23 2/5 2/6 2/7 2/8 2/9
 Clinton, Fin. 19 1/2 17 1/2 15 1/2 14 1/2.....40&5&2%
 Essex.....28 2/5 2/6 2/7 2/8 2/9.....30&5%
 Lyra.....9 1/2 9 1/4 9 1/8 9 1/4.....net
 Snowden.....9 1/2 9 1/4 9 1/8 9 1/4.....net
 Standard.....23 2/5 2/6 2/7 2/8 2/9.....35%
 Vulcan.....23 2/5 2/6 2/7 2/8 2/9.....25%
 Northwest.....23 2/5 2/6 2/7 2/8 2/9.....25%
 C. B. K.....25 2/5 2/6 2/7 2/8 2/9.....40%
 A. C.....25 2/5 2/6 2/7 2/8 2/9.....40&10%
 Maud S.....25 2/5 2/6 2/7 2/8 2/9.....50&10&5%
 Champlain.....28 2/5 2/6 2/7 2/8 2/9.....40&5&2%
 Champion.....25 2/5 2/6 2/7 2/8 2/9.....10&10&10%
 Capewell.....19 1/2 17 1/2 15 1/2 14 1/2.....10&5%
 Anchor.....23 2/5 2/6 2/7 2/8 2/9.....35%
 Western.....23 2/5 2/6 2/7 2/8 2/9.....50%
 Empire Bronzed.....13&14 1/2

Picture—

Brass Head, Sargent's list.....60&60&10%
 Brass Head, Combination list.....50&10%
 Porcelain Head, Sargent's list.....50&10&10%
 Porcelain Head, Combination list.....40&10%
 Niles' Patent.....40%

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—

See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Square, Hex.
 Hot Pressed.....5.80 6.50 off list
 Cold Punched.....5.00 6.10 off list
 In packages of 100 lb, add 1-10% off list
 net; in packages less than 100 lb, add 1/2% # lb. net.

Oakum—

Best or Government.....# lb 6 1/2 @ 7 1/4
 U. S. Navy.....# lb 5 1/2 @ 6 1/4
 Navy.....# lb 5 1/2 @ 5 3/4

Oil Tanks—See Tanks, Oil.

Oilers—

Zinc and Tin.....65&10&70&5%
 Brass and Copper.....50&10&60&10&5%
 Malleable, Hammers' Improved, No. 1, \$3.60; No. 2, \$4.00; No. 3, \$4.40.....10&10&5%
 Malleable, Hammers' Old Pattern, same list.....45%
 Prior's Pat. or "Paragon" Zinc.....60&10&10%
 Prior's Pat. or "Paragon" Brass.....50%
 Olmstead's Tin and Zinc.....50%
 Olmstead's Brass and Copper.....60%
 Broughton's Zinc.....60%
 Broughton's Brass.....50%
 Steel, Draper & Williams.....60%

Openers, Can—

Messenger's Comet.....# doz \$3.00, 25%
 American.....# gross \$2.75 to \$3.00
 Duplex.....# doz 25¢, 15¢ to 20¢
 Lyman's.....# doz \$3.75, 20%
 No. 4, French.....# doz \$2.25, 55¢ to 60¢
 No. 5, Iron Handle.....# gr \$6.00, 45¢ to 50¢
 Eureka.....# doz \$2.50, 10%
 Sardine Scissors.....# doz \$2.75 to \$3.00
 Star.....# doz \$2.75
 Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50.....60%
 Excelsior, No. 1 \$2.50; No. 2, \$1.50.....40%
 World's Best # gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50&10%
 Universal, # doz \$3.00.....55&5%
 Domestic, # doz \$2.00.....45%
 Champion, # doz \$2.00.....50%
 Moore's.....70%

Packing, Steam—

Rubber—

Standard, fair quality.....70&70&10%
 Inferior quality.....75&80%
 Extra.....80&90&25%
 N. Y. B. & P. Co., Standard.....50%
 N. Y. B. & P. Co., Empire.....60%
 N. Y. B. & P. Co., Salamander.....25%
 Jenkins' Standard, # lb 80¢.....25&25&5%
 Miscellaneous—
 American Packing.....10¢ 11¢ 12¢
 Russia Packing.....14¢ 15¢ 16¢
 Italian Packing.....13¢ 14¢ 15¢
 Cotton Packing.....15¢ 16¢ 17¢
 Jira.....70&80

Pails—

Creamery—
 S. S. & Co., 18-qt., \$7.00; 20-qt., \$7.25 # doz.

Galvanized—

Quarts 10 12 14
 Hill's Light Weight, # doz. \$2.75 3.00 3.25
 Hill's Heavy Weight, # ds. 3.00 3.25 3.75
 Selwig's.....2.50 2.75 3.00
 Sidney Shepard & Co.....2.50 2.75 3.00
 Iron Clad.....2.50 2.75 3.00
 Fire Buckets.....2.75 3.25 3.50
 Buckets—See Well Buckets.

Indurated Fiber Ware

Star Pails, 12 qt.....# doz \$4.50
 Milk, 14 qt.....# doz \$5.40
 Stable, 14 qt.....# doz \$6.00
 Fire Pails, deep.....# doz \$4.80
 Fire Pails, round bottom.....# doz \$5.40

Standard Fiber Ware—

Water Pails, 12 qt., # doz. \$3.15 3.75
 Dairy Pails, 14 qt., # doz. 3.75 4.25
 Fire Pails, No. 1, 12 qt., # doz 3.75 4.25
 Fire Pails, No. 2, 14 qt., # doz 5.50 6.00
 Sugar Pails.....4.50
 Horse Pails.....4.50
 Buggy Pails.....8.50
 Slop Jars (bal. trap).....7.50 8.50
 Chamber Pails, 14 qt.....6.00 7.00

Pans—

Dripping—
 Small sizes.....# lb 5 1/2¢
 Large sizes.....# lb 6 1/2¢
 Silver & Co. (Covered) Fry.....40%

Standard List:—

No.....0 1 2 3 4
 # doz. \$3.00 \$3.75 \$4.25 4.75 \$5.25
 No.....5 6 7 8 9
 # doz.....\$6.00 \$7.00 \$8.00 \$9.00
 Polished, regular goods.....75¢ to \$1.00
 Acme Fry Pans.....60%

Dust—

Steel Edge, No. 1.....# doz \$1.75

Roasting and Baking—

Colombian, S. S. & Co., Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each.....60&10%

Paper and Cloth—

Sand and Emery—
 List April 18, 1886.....50&10&50&10&10%
 Sibley's Emery and Crocus Cloth.....30%

Parers—

Apple—
 Advance.....# doz \$4.75
 Baldwin.....# doz 5.25
 Bonanza.....# doz 5.00
 Daisy.....# doz 4.00
 Dandy.....# doz 7.50
 Eclipse.....# doz 4.00
 Eureka, 1888.....# doz 12.00
 Family Bay State.....# doz 12.00
 Favorite.....# doz 5.00
 Gold Medal.....# doz 4.00
 Ideal.....# doz 4.00
 Improved Bay State.....# doz \$7.00 to \$8.00
 Little Star.....# doz 4.50
 Monarch.....# doz 13.50
 No. 1 Lightning.....# doz 5.50
 Oriole.....# doz 4.00
 Penn.....# doz 3.00
 Perfection.....# doz 4.00
 Pomona.....# doz 4.00
 Rocking Table.....# doz 6.00
 Turn Table.....# doz 4.50
 Victor.....# doz 13.50
 Waverly.....# doz 4.00
 White Mountain.....# doz 4.00
 Reading 72.....# doz 4.25
 Reading 78.....# doz 7.00

Potato—

White Mountain.....# doz \$4.50
 Antrim Combination.....# doz \$5.50
 Hoosier.....# doz \$13.50
 Saratoga.....# doz \$5.50

Pencils—

Faber's Carpenters'.....high list 50¢
 Faber's Round Gilt.....# gro \$5.25
 Dixon's Lead.....# gro \$4.50
 Dixon's Lumber.....# gro \$6.75
 Dixon's Carpenters'.....# gro \$6.75

Pencils, Soapstone—

See Crayons.

Pickers, Fruit—

Prize Fruit Pickers.....50%

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....60&10&50&60&10&10&5%

Picture Nails—

See Nails, Picture.

Pinking Irons—

See Irons, Pinking.

Pins—

Humason, Beckley & Co.'s.....60&10%
 Sargent & Co.'s, \$17 and \$18.....60&10%
 Peck, Stow & W. Co.....60&10&50&10&5%

Curtain—

Silvered Glass.....net
 White Enamel.....net

Escutcheon—

Iron, list Nov. 11, 1885.....60&10&50&10&5%
 Brass.....60&60&5%

Pipe, Wrought Iron—

List April 13, 1893.
 1 1/2 and under, Plain.....67 1/2%
 1 1/2 and under, Galv.....60&10%
 1 1/2 and over, Plain.....67 1/2%
 1 1/2 and over, Galv.....67 1/2%
 Boiler Tubes, list Oct. 24, 1892.....55&10%
 Casting, list Nov. 18, 1892.....52 1/2%
 Inserted Joints Casting, list Nov. 18, 1892.....47 1/2%
 Steel Boiler Tubes.....27 1/2%
 Cold Drawn Seamless Steel Tubing.....50%

Planes and Plane Irons—

Wood Planes—
 Molding.....40&10%
 Bench, First quality.....45&10%
 Bench, Second quality.....50&10%
 Bailey's (Stanley R. & L. Co.).....60&10%
 Iron Planes
 Bailey's (Stanley R. & L. Co.).....50&10%
 Miscellaneous Planes (Stanley R. & L. Co.).....25&10%
 Stearns' Iron Planes.....50&50&5%
 Meriden Mal. Iron Co.'s.....50&50&5%
 Davis' Iron Planes.....50&50&5%
 Birmingham Plane Co.....60&60&5%
 Gage Tool Co.'s Self-Setting.....20&10&10%
 Chapin's Iron Planes.....50&50&5%
 Standard Tool Co.....50&50&5%

Plane Irons—

Butcher's.....\$5.00 to \$5.25 to 3¢
 Buck Bros.....30¢

Auburn Thistle.....30&10&30&10&10%
 Ohio.....25%
 Sandusky.....50&10%
 L. & J. White.....25%
 Stanley R. & L. Co.....50&10%

Plates—

Felice.....# lb 6¢ to 8 1/2¢

Pilers and Nippers—

Button's Patent.....60%
 Hally No. 2, 1 in., \$13.50; No. 4, 7 in., \$21.00 # doz.....40%
 Humason & Beckley Mfg. Co. 50&50&10%
 Lindsay's Giant.....33&4%
 Gas Pilers.....60%
 Gas Pilers, Custar's Nickel Plated.....60&5%
 Eureka Pilers and Nippers.....40%
 Russell's Patent.....25%
 P. S. & W. Cast Steel.....50%
 P. S. & W. Timmers' Cutting Nippers, add 6¢.....10%
 Carey's Pat. Wire Cutters.....20%
 Morrill's Parallel, # doz. \$12.00.....30&5%
 Cronk's 1 in., \$15.00; 10 in.....50%
 Cronk's 2 in. Slatem.....50&10&5%
 Cronk's Carrier Pliers.....60&60&5%

Plumbs and Levels

Regular list.....75&10&75&10&10%
 Stanley's Duplex.....20&10%
 Stanley's Handy.....20&10%
 Disston's.....50%
 Cook's.....40&10%
 Pocket Levels.....70&10&70&10&10%
 Davis Iron Levels.....30%
 Davis Inclinometers.....10&10%

Poachers, Egg—

Buffalo Steam Egg Poachers, # doz. No. 1, \$6.00; No. 2, \$9.00.....33&4%
 Silver & Co., 6-Ring, # doz. \$4.00; 3-Ring.....\$2.00

Pokes, Animal—

Bishop A. J. L.....# doz \$6.00
 Bishop's Monarch.....# doz \$4.50
 Bishop's Pioneer.....# doz \$4.00
 Bishop's American.....# doz \$3.00
 Eagle, Point State.....# doz \$5.75
 Eagle, Single State.....# doz \$3.75
 Buckeye, Single State.....# doz \$2.75
 Bolding.....# doz \$6.00
 Metallo Horse Poke.....# doz \$6.00

Police Goods—

R. I. Tool Co., Handcuffs, \$15.00 # doz 10¢
 R. I. Tool Co., Leg Irons, \$25.00 # doz 10¢
 Towler's.....25%
 Daley's Improved Handcuffs, 2 Hands, Polished, # doz. \$4.00; Nickleled, \$67.00; 3 hands, Polished, # doz. \$72.00; Nickleled, \$88.00.....25%
 J. P. Lovell's Police Goods.....25%

Polish—

Metal—

Prestoline.....30%
 Prestoline Paste.....33&4%
 Gaston's Silver Compound.....33&4%

Stove—

Joseph Dixon's.....# gro. \$5.00, 10%
 Gem.....# gro. \$4.50, 10%
 Gold Medal.....# gro. \$6.00, 25%
 Lustrous.....# gro. \$4.75
 Ruby.....# gro. \$3.75
 Reading 3, 6 gro lots.....# gro. \$5.50
 Dixon's Plumber.....# lb 18

Pullers Nail—

Scranton..... \$ doz., \$18.00, 38¢
 Giant, No. 1..... \$ doz., \$18.00, 10¢
 Giant, No. 2..... \$ doz., \$16.00, 10¢
 Pelican..... \$ doz., \$9.00, 25¢
 Eclipse..... \$ doz., \$24.00, 40¢
 Economy..... \$ doz., \$6.00

Pulleys—

Hot House, Laving, &c..... 60¢@70¢
 Japanned Screw..... 60¢@10¢
 Brass Screw..... 70¢
 Japanned Side..... 60¢@10¢
 Moore's Side, Anti-Friction..... 50¢
 Moore's Ceiling or End, Anti-Friction..... 40¢
 Moore's Dumb Waiter, Anti-Friction..... 50¢
 Moore's Electric Light..... 38¢
 Japanned Clasp..... 60¢@10¢
 Hay Fork, Solid Eye, 5 in. solid..... \$4.50
 Hay Fork, "Anti-Friction," 5 in. solid..... \$5.70
 Hay Fork, "P" Common and Patent..... 20¢
 Bushed..... 20¢
 Hay Fork, Tapered Self-Lubricating..... 60¢
 Hay Fork, Moore's Anti-Friction 5 in. Wheel, \$ doz., \$12.00..... 40¢
 Shade Rack..... 45¢
 Tackle Blocks—See Blocks.
 Shepard's Niagara, No. 25, \$ doz 23¢ net
 Sash (Auger Mordise)..... 60¢
 Common sense..... 60¢
 Empire..... 60¢
 Ideal, Nos. 2, 4, 10 & 15..... 40¢ less 1¢
 Acme..... 40¢ net.
 Star..... 40¢ net.
 On bbl. lots extra 5¢.
 Ideal, Nos. 25 and 55..... \$ doz. 22¢ net.

Pumps—

Cistern, Best Makers..... 60¢@60¢10¢
 Pitcher Spout, Best Makers..... 67¢@70¢
 Pitcher Spout, Cheaper Q'ds. 75¢@75¢10¢

Punches—

Saddler's or Drive, good..... \$ doz., 60¢@65¢
 Bemis & Call Co.'s Cast Steel Drive..... 60¢@65¢
 Bemis & Call Co.'s Springfield Socket..... 60¢
 Spring, good quality..... \$ doz., \$2.50@3.00
 Spring, Leach's Pat..... 15¢
 Bemis & Call Co.'s Spring..... 50¢@55¢
 Bemis & Call Co.'s Check..... 55¢
 Solid Tinners', P., S. & W. Co., \$ doz..... \$1.44
 Tinners' Hollow Punches, P., S. & W. Co..... 30¢@35¢
 Rice Hand P. Hs..... 40¢
 Avery's Revolving..... 40¢
 Avery's Sawset and Punch—See Sawsets
 Niagara Hollow Punches..... 20¢@25¢
 Niagara Solid Punches..... 55¢

Rail—

Sliding Door, Wrt Brass..... \$ d. 35¢, 40¢
 Sliding Door, Bronzed Wrt Iron..... \$ ft., 7¢
 Sliding Door, Iron, Painted..... \$ ft., 4¢, 40¢
 Barn Door, Light, In..... \$ 1/2
 Per 100 feet..... \$2.00 2.50 3.10, 10¢
 B. D. for N. E. Hangers..... Small, Med. Large.
 Per 100 feet..... \$3.15 2.70 3.25 Net

Terry's Steel Rail..... \$ ft., 4¢
 Victor Track Rail, 7¢ per foot..... 50¢@55¢
 Carrier, double braced, Steel Rail, 7¢ per foot..... 30¢@35¢
 Lundy Parlor Door, Planed Edge, 7¢ per ft..... 25¢@30¢
 Moore's Steel Rail..... 25¢@30¢
 Moody Steel Rail \$ ft., 5¢..... 45¢

Rakes—

Cast Steel, Association Q'ds..... 70¢@70¢5¢2¢
 Cast Steel, outside Q'ds..... 70¢@70¢5¢2¢
 Malleable..... 70¢@70¢5¢2¢
 Gibbs' Lawn Rake..... \$ doz., \$4.90
 Gibbs' Canton Lawn Rake..... \$ doz., \$3.75
 Gibbs' Acme Lawn Rake..... \$ doz., \$4.75
 Gibbs' Favorite Lawn Rake..... \$ doz., \$3.90
 Gibbs' Crown Lawn Rake, No. 1..... \$ doz., \$4.90; No. 2, \$3.40
 Oneida Lawn Rake..... \$ doz., \$6.00
 Fort Madison Prize Bow Brace and Feetless..... 65¢
 Fort Madison Steel Tooth Lawn Rake..... \$3.00..... 25¢

Razors—

J. R. Torrey Razor Co..... 20¢
 Wostenholm and Butcher, \$10 to £..... 10¢
 Jordan & Jordan, \$10 to £..... Net
 Jordan's Old Faithful, now in..... Net
 Galvanic..... \$ doz., \$15.00
 Electric Cutlery Co..... Net
 Campbell Cutlery Co..... 50¢

Razor Straps—

See Straps, Razor.

Registers—

Moore's Japanned..... 75¢
 Moore's Electroplated..... 75¢
 Moore's Bronze Finishes..... 70¢
 Moore's Solid Bronze..... 65¢
 Moore's Stove Pipe..... 38¢

Rings and Ringers—**Bull Rings—**

Union Nut Co..... 55¢
 Sargent's..... 75¢@10¢
 Hotchkiss' low list..... 30¢
 Humason, Beckley & Co.'s..... 70¢@10¢
 Peck, Stow & W. Co.'s..... 50¢@10¢
 Elrich Edw. Co., White Metal, low list..... 50¢@50¢10¢

Hog—

Top of the Hill Ringers..... \$ doz \$2.00
 Top of the Hill Ringers..... \$ doz \$1.25
 Hill's Improved Ringers..... \$ doz \$1.25
 Hill's Old Style Ringers..... \$ doz \$1.19¢
 Hill's Tongue..... \$ doz \$3.00
 Hill's Ringers..... \$ doz \$2.00
 Perfect Rings..... \$ doz \$1.50
 Perfect Rings..... \$ doz \$1.25@3.25
 Blair's Hog Ringers..... \$ doz \$2.00
 Blair's Hog Ringers..... \$ doz \$0.90@1.00
 Champion Ringers..... \$ doz \$2.00
 Champion Ringers, Double..... \$ doz \$2.25
 Brown's Ringers..... \$ doz \$1.00
 Brown's Ringers..... \$ doz \$1.15@1.25
 Electric Hog Ringers..... \$ doz boxes \$1.50
 Electric Hog Ringers..... \$ doz \$2.00
 Major Ringers..... \$ doz \$1.25
 Major Ringers..... \$ doz \$2.00

Rivets and Burrs—

Norway Iron, list Nov. 17, '87..... 60¢@10¢
 Second quality..... 70¢
 Copper..... 60¢@60¢10¢
 Coppered Iron, Betina Brand..... 50¢@5¢

Rivet Sets—See Sets.**Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Stair, Brass..... 25¢@80¢
 Stair, Black Walnut..... \$ doz 40¢

Rollers—

Barn Door, Sargent's list..... 60¢@10¢10¢
 Aime Moore's Anti-Friction..... 55¢
 Union Barn Door Roller..... 70¢
 Moore's Barn Door Stay..... 30¢
 Thomson Mfg. Co.'s Lawn Rollers..... 30¢

Rope—The following prices are f. o. b. New York or factory, and are shaded 1/4¢ on large lots; terms, 1 1/2% for cash.

Manila, 7-16 in. diam. and larger..... \$ 8 3/4¢
 Manila, 1/4 and 5-16 in. diam..... \$ 9 1/4¢
 Manila, Tarred Rope..... \$ 8 1/4¢
 Manila, Hay Rope, Medium..... \$ 8 1/4¢
 Sisal..... 7-16 inch and larger..... \$ 8 1/4¢
 Sisal..... 1/4 and 5-16 in. diam..... \$ 7 3/4¢
 Sisal, Hay Rope..... \$ 8 1/4¢
 Sisal, Tarred Rope..... \$ 8 1/4¢
 Sisal, Medium Lath Yarn..... \$ 8 1/4¢
 New Zealand, 7-16 in. & larger..... \$ 8 1/4¢
 New Zealand..... 1/4 inch,..... \$ 8 1/4¢
 New Zealand..... 1/4 and 5-16 inch,..... \$ 7 3/4¢
 New Zealand, Hay Rope..... \$ 8 1/4¢
 New Zealand, Tarred Rope..... \$ 8 1/4¢
 Cotton Rope..... \$ 13 1/2¢@14¢
 Jute Rope..... \$ 6 1/2¢@7¢

Wire—

List February, 1892. All kinds..... 45¢

Rules—

Boxwood..... 30¢@10¢10¢@80¢10¢10¢10¢
 Ivory..... 50¢@10¢
 Starrett's Steel Rules and Straight Edges..... 25¢@10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—

See Stuffers or Fillers, Sausage.

Note.—Extra 5¢@10% often given.

Saws—

Disston's Circular..... 45¢@45¢5¢
 Disston's Cross Cut, list Jan. 1, '93..... 40¢@10¢
 Disston's Hand..... 25¢
 Woodrough & McFarlin..... 25¢@10¢
 Hand, Panel and Rip..... 30¢@10¢
 Cross Cuts, list Jan. 1, 1893..... 45¢@10¢
 Wheeler, Madden & Clemons Mfg. Co. Hand, Panel and Rip..... 30¢@10¢
 Cross Cuts, list Jan. 1, 1893..... 45¢@10¢
 Atkins' Circular..... 50¢@10¢
 Atkins' Cross Cuts, new list..... 40¢
 Atkins' Mulay Mill and Drag..... 50¢@10¢
 Atkins' One-Man Saw..... 40¢
 Atkins' Wood Saws..... 40¢
 Peace Circular and Mill..... 45¢@45¢5¢
 Peace Hand Panel and Rip..... 25¢@25¢5¢
 Peace Cross Cuts, list Jan. 1, '93..... 45¢@10¢
 Richardson's Circular and Mill..... 45¢@45¢5¢
 Richardson's Circular, list Jan. 1, '93..... 45¢@10¢
 Richardson's Hand, &c..... 25¢@25¢5¢
 C. E. Jennings & Co.'s..... 25¢

Hack Saws—

Griffin's, complete..... 40¢@10¢50¢
 Griffin's Hack Saw Blades..... 40¢@10¢50¢
 Star Hack Saws and Blades..... 25¢
 Eureka and Crescent..... 25¢

Scroll—

Lester, complete, \$10.00..... 25¢
 Rogers, complete, \$4.00..... 25¢
 Barnes' Builders' and Cab Makers'..... 15¢
 Barnes' Scroll Saw..... 35¢

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality..... \$ doz \$18.00@19.00
 Hatch, Tea, No. 161..... \$ doz \$6.50@7.00
 Union Platform, Plain..... \$2.10@2.20
 Union Platform, Striped..... \$2.40@2.50
 Chatillon's Grocers' Trip Scales..... 25¢
 Chatillon's Eureka..... 25¢
 Chatillon's Favorite..... 25¢
 Family Turnbulla..... 30¢@30¢10¢
 Rielle Bros.' Platform..... 40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting..... 45¢**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.) \$6.00..... 30¢@10¢
 Box, 1 Handle..... \$ doz \$2.25@2.50
 Box, 2 Handle..... \$ doz \$2.75@3.00
 Defence Box and Ship..... 40¢@10¢
 Foot..... 60¢@10¢60¢
 Ship, Commander's..... \$ doz \$3.50 net
 Ship, R. I. Tool Co..... \$ doz \$3.50 net

Screen Window and Door**Frames—See Frames****Screw Drivers—**

See Drivers, Screw.

Screws—**Bench and Hand—**

Bench, Iron..... 55¢@10¢55¢@10¢10¢
 Bench, Wood, Beech..... \$ doz \$2.25
 Bench, Wood, Hickory..... 20¢@10¢
 Hand, Wood..... 25¢@10¢25¢@10¢5¢
 Hand, Grand Rapids, list..... 35¢

Coach, Lag and Hand-Rail—

Lag, Blunt Point, list Jan. 1, 1890..... 80¢@80¢10¢
 Coach and Lag, Gimlet Point, list Jan. 1, 1890..... 80¢@80¢5¢
 Hand Rail, Sargent's..... 70¢@10¢
 Hand Rail, H. & B. Mfg. Co..... 70¢@10¢75¢
 Hand Rail, Am. Screw..... 75¢

Jack Screws—

Jack Screws, Millers Falls list..... 50¢@50¢10¢
 Jack Screws, P., S. & W..... 35¢
 Jack Screws, Sargent..... 70¢
 Jack Screws, Stearns..... 40¢@40¢10¢

Cork—

Humason & Beckley Mfg. Co..... 40¢@10¢50¢
 Williamson's..... 33¢@33¢5¢
 Williamson's Forged Worm Applewood Handle, \$ doz., \$5.00; Rosewood, \$5.50..... 40¢
 Detroit Cork Screw Co..... 33¢

Machine—

Flat Head Iron..... 65¢
 Round Head Iron..... 60¢

Wood—

List January 1, 1891.
 Flat Head Iron..... 70¢
 Round Head Iron..... 65¢ Extra 10¢
 Flat Head Brass..... 70¢ 10¢ often given.
 Round Head Brass..... 65¢
 Flat Head Bronze..... 70¢
 Round Head, Bronze..... 65¢
 Rogers' Drive Screws..... 82¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Grain..... 40¢@5¢40¢10¢
 Grass..... 40¢@40¢50¢

Scythe Snaths—

See Snaths, Scythe.

Sets—

Awl and Tool—
 Alken's Set, Awls and Tools, No. 20, \$ doz \$10.00..... 60¢@60¢5¢
 Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9..... 45¢
 Millers Falls Adj. Tool Hds., No. 1, \$12; 2, \$18..... 25¢
 Henry's Combination Haft..... \$ doz \$6.50
 Stanley's Excelsior..... No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50..... 30¢@10¢
 Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50..... 70¢@10¢5¢

Nail—

Square..... \$ gr. \$4.00@4.25
 Round..... \$ gr. \$3.25
 Buck Bros..... 27¢
 Cannon's Diamond Point..... \$ gr. \$12, 20¢

Rivet—

Regular list..... 70¢

Saw—

Stillman's Genuine..... \$ doz \$5.00@7.75, 40¢@5¢
 Stillman's Pattern, Hand, \$ doz \$3.25; Cross Cut, \$5.50..... 55¢@55¢10¢
 Common Lever..... \$ doz \$2.00, 45¢@50¢
 Morris, \$ doz..... 40¢@20¢
 No. 11, \$16.00..... 40¢@20¢
 No. 3 and 4, Cross Cut, \$23.00..... 40¢@20¢
 No. 6, Mill, \$31.00..... 40¢@20¢
 No. 10, \$15.50..... 40¢@20¢
 Leach's, No. 0, \$8.00; No. 1, \$15..... 15¢@20¢
 Nash's..... 20¢@10¢20¢10¢10¢
 Hammer, Hotchkiss..... \$5.50, 10¢
 Hammer, Bemis & Call Co.'s new Pat..... 45¢
 Bemis & Call Spring Hammer..... 30¢@5¢
 Bemis & Call Co.'s Plate..... 20¢
 Bemis & Call Co.'s Cross Cut..... 30¢@5¢
 Alken's Genuine..... \$13.00, 60¢@60¢10¢
 Alken's Imitation..... \$ doz \$3.00@3.25
 Hart's Pat. Lever..... 25¢
 Disston's Star..... 25¢
 Leopold..... 40¢@10¢50¢
 Atkin's Lever..... \$ doz No. 1, \$6.00
 Atkin's Criterion..... \$ doz No. 1, \$8.00
 Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00..... 40¢@10¢50¢
 Hart's Pat. Punch..... 50¢
 Kohler's Royal..... \$ doz \$7.00
 Kohler's Giant Royal..... \$ doz \$12.00
 Crescent..... \$ doz \$3.00
 Lloyd's Acme..... \$ doz \$15, 40¢10¢
 Taintor Positive..... \$ doz \$18, 50¢

Sharpeners, Knife—

Larkins' Applewood Handles..... \$ doz \$6.00, 40¢
 Rosewood or Cocobola..... \$ doz \$9.00, 40¢

Shaves, Spoke—

Iron..... 45¢
 Wood..... 30¢
 Bailey's (Stanley R. & L. Co.)..... 40¢@10¢
 Stearns'..... 30¢@10¢
 Cincinnati..... 25¢@10¢
 Goodell's \$ doz \$9.00..... 25¢

Shears—

American Cast Iron, 75¢@10¢75¢10¢5¢
 Barnard Lamp Trimmers..... \$ doz \$3.75
 Seymour's, list Dec. 1881..... 60¢@10¢10¢60¢10¢10¢5¢
 Heinisch's, list Dec. 1881..... 60¢@10¢10¢60¢10¢10¢5¢
 Heinisch's Tailor's Shears..... 35¢
 First quality..... 80¢@80¢10¢
 Second quality..... 80¢@10¢80¢10¢10¢
 Acme Cast Shears..... 10¢@10¢
 Diamond Cast Shears..... 10¢
 Clipper..... 10¢@10¢
 Victor Cast Shears..... 75¢@10¢75¢10¢5¢
 Howe Bros. & Hubert, Solid Forged Steel..... 70¢
 Hatch Cutlery Co., Solid Steel Forged..... 60¢
 Davenport Cutlery Co..... 60¢@60¢10¢
 Claus brand, Japanned, same list..... 70¢
 Claus brand, Nickel, same list..... 60¢
 Galvanic 3/4 to 9 in., \$ doz \$1.00..... Net
 Electric Cutlery Co..... Net
 Campbell Cutlery Co., Jap'd..... 75¢
 Nickel Plated..... 65¢

Tinners' Snips—

Wrt. Handles, Steel Blades..... 20¢@20¢10¢
 Niagara Snips and Shears..... 20¢@10¢
 Cast Handles, Laid with Steel..... 40¢

Pruning Shears and Hook

Disston's Combined Pruning Hook and Saw..... \$ doz \$18.00, 20¢@10¢
 Disston's Pruning Hook..... \$ doz \$20.00
 E. S. Lee & Co.'s Pruning Tools..... 50¢@10¢70¢
 Pruning Shears, Henry's Pat. \$ doz..... \$3.75@4.00
 Henry's Pruning Shears, \$ doz..... \$4.25
 Wheeler, M. & C. Co., Combination..... \$ doz \$12.00
 Dunlap's Saw and Chisel, \$ doz \$3.50, 30¢
 J. Mallinson & Co., No. 1, \$6.25; No. 2, \$7.25
 P., S. & W. Co..... 60¢
 Levin Pruner No. 1, \$15.00 \$ doz 40¢@35¢
 Levin Pruner No. 2, \$21.00 \$ doz 40¢@35¢

Tinners', &c.—

Shears and Snips (P. S. & W.)..... 20¢@25¢
 Snips, J. Mallinson & Co..... 33¢

Sheaves—

Sliding Door—

M. W. Co., list July, 1893..... 50¢@10¢60¢5¢
 R. & E., list Dec. 18, 1885..... 55¢@20¢
 Corbin's list..... 60¢@10¢25¢
 Patent Roller..... 60¢@10¢25¢
 Patent Roller, Hatfield's..... 75¢
 Russell's Anti-Friction, list Dec. 18, 1885..... 60¢@25¢
 Moore's Anti-Friction..... 50¢

Sliding Shutter—

R. & E., list Dec. 18, 1885..... 60¢@10¢25¢
 Sargent's list..... 70¢
 Reading list..... 60¢@10¢10¢

Shells—

First quality 4, 8, 10 and 12 gauge..... 25¢@10¢25¢
 First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list)..... 20¢@10¢25¢
 Prize..... 40¢@25¢
 Star, Club, Rival and Climax Brands..... 35¢@10¢25¢
 Smokeless brand, 12, 10, 16 gauge..... 35¢@10¢25¢
 Trap brand, 12 and 10 gauge, 35¢@10¢25¢
 Seibold's Comb. Shot Shells..... 15¢@25¢
 Brass Shot Shells, 1st quality..... 60¢@25¢
 Brass Shot Shells, Club, Rival, Climax..... 65¢@25¢

Shells, Loaded—

Standard list, July 19, 1890..... 40¢@10¢10¢40¢10¢5¢
 7¢ cash, 10 days.

Ship Tools—

L. & I. J. White..... 20¢@5¢

Shoes, Horse, Mule, &c**Horse—**

Burden's, Perkins', Phoenix, Standard, Diamond State, Brydens' Boss and Crescent, at factory..... \$4.00
 Bryden's Frog Pressure, at factory..... \$5.00

Mule—

Add 1¢ keg to above prices.

Ox Wrought—

Ton lots..... \$ m 9¢
 1000 m lots..... \$ m 9¢
 500 m lots..... \$ m 10¢

Shot—

Drop, up to B, 25-d bag..... \$1.45
 Drop, up to B, 5-d bag..... 45¢
 Drop, B and larger, 25-d bag..... 1.70
 Drop, B and larger, 5-d bag..... 40¢
 Buck and Chilled, 25-d bag..... 1.70
 Buck and Chilled, 5-d bag..... 40¢
 Dust Shot, 25-d bag..... 40¢
 Dust Shot, 5-d bag..... 45¢

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885..... 20¢
 Note.—Jobbers frequently give 5¢@7¢ extra on above.
 Griffith's Black Iron..... 50¢@10¢
 Griffith's C. S..... 60¢@60¢5¢
 Griffith's Solid C. S. R. R. Good..... 20¢
 St. Louis Shovel Co..... 20¢@20¢75¢
 Hussey, Blans & Co..... 15¢@25¢
 Hubbard & Co..... 20¢@20¢75¢
 Lehigh Mfg. Co..... 50¢@10¢
 H. M. Myers Co..... 30¢
 Payne Pettibone & Son..... 35¢@5¢
 Remington's (Lowman's) Pat..... 40¢@10¢50¢
 Rowland's Black Iron..... 60¢@10¢50¢

Whips

American Whip Co.	Length	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8 ft.
X. L. Whalebone Driving	11	20.00	22.00	24.00	27.00	30.00	33.00	36.00	
Eureka, Two-thirds Whalebone		15.00	16.50	18.00	20.00				
Bull Bone, Half-length Whalebone			11.00	12.00	13.00	15.00			
American Standard	6.00	8.50	9.50	10.50	12.00	13.50	15.00	16.50	
True Grip, Raw Hide Center	6.00	6.00	6.50	7.00	7.50	8.00			
New Name, Stocked Java, Black and Wine Colors					6.00				
Americus, 98 Pen Whip					6.00				
Gents' Light Driving No. 111					6.00				
Gents' Light Driving No. 100					6.00				
Hand-made Stocked Java No. 105			3.75	4.00					
A large variety of cheaper grades						50¢@75.00			
Team Whips						\$2.00@7.50			
Toy Whips						\$2.50@12.00			
Hardware Assortment, 10/American, 75 Whips for \$50.00.									

Wire and Wire Goods—

Iron—

Market,

Br. & Ann. Nos. 0 to 18.	75¢@75¢10¢	Extra 50¢10¢
Cop'd, Nos. 0 to 18.	75¢@75¢10¢	often given
Galv. Nos. 0 to 18.	70¢@70¢10¢	and net
Tin'd, Tin'd list, Nos. 0 to 18.	70¢@70¢10¢	prices often
		made on
		large lots.

Stone, Br. and Ann'd, Nos. 16 to 18.	80¢	Extra 10¢
Nos. 19 to 26.	80¢5¢	often given.
Nos. 27 to 36.	82¢@25¢	
Tinned Broom Wire, 18 to 21.	75¢10¢	
Galvanized Fence	75¢10¢	
Copper, list Jan. 18, 1894.	40¢5¢	
Copper, list Jan. 18, 1894.	40¢5¢	
Ann'd Wire on Spools.	60¢5¢	
Malin's Ann'd & Tin'd on Spools.	60¢5¢	
Malin's Brass and Cop. on Spools.	60¢5¢	
Ossawan Mills, Ann'd and Tinned on Spools.	60¢10¢	

Per Dozen.

Ossawan Mills, Brass and Copper on Spools. 50¢10¢
 Tate's Spooled, Tin'd & Annealed. 60¢5¢
 Tate's Spooled, Cop. and Brass. 60¢
 Cast Steel Wire. 50¢10¢
 Stub's Steel Wire. 50¢10¢
 Steel Music Wire, 15 to 30, imported. 60¢70¢

Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard list. 85¢10¢@85¢10¢10¢

Wire Cloth and Netting—

Painted Screen Cloth 100 ft. \$1.75

Galvanized Wire Netting. 75¢75¢10¢

Wire Barb—

See Trade Report.

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable	40¢
Baxter's Adjustable "S"	40¢10¢50¢
Baxter's Diagonal	50¢50¢10¢
Coe's Genuine	50¢50¢10¢
Coe's "Mechanics"	50¢50¢10¢
Girard Standard	65¢10¢70¢
Lamson & Sessions' Engineers'	60¢10¢
Lamson & Sessions' Standard	70¢10¢
P. S. & W. Agricultural	75¢10¢80¢
Girard Agricultural	75¢10¢80¢
Lamson & Sessions' Agric'l	75¢10¢80¢
W. & B. Diamond	75¢10¢80¢

Bemis & Call's:	
Pat. Combination Bright	40¢5¢
Pat. Combination Black	40¢10¢
Merrick's Pattern	45¢
Briggs & Eastern	30¢10¢
Cylinder or Gas Pipe	45¢5¢
No. 8 Pipe	55¢
Aiken's Pocket (Bright)	\$6.00, 50¢10¢
The Favorite Pocket	\$4.00, 40¢
Webster's Pat. Combination	25¢
Boardman's	25¢5¢
Always Ready	30¢
Alligator	50¢
Donohue's Engineer	20¢10¢
Eagle	50¢10¢
Aome, Bright	50¢25¢
Aome, Nickel'd	40¢25¢
Hercules	70¢
Walker's	70¢
Diamond Steel	55¢3¢
Cincinnati Brace Wrenches	25¢10¢
Taft's Vise Wrench	55¢10¢3¢

Wringers, Clothes

Am. Wringer Co.'s list, July 1, '93.	2¢ cash
Colby Wringer Co.'s list, Sept. 1, '91.	2¢ cash
Lovell Mfg. Co., list July 1, 1892.	2¢ cash
Peerless Mfg. Co., list Feb., 1892.	2¢ cash
National Wringer & Mfg. Co., list June 1, 1892.	2¢ cash

Wrought Goods—

Staples, Hooks, &c., list, March 17, 1892.	85¢10¢85¢15¢
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Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable Oils—

Linseed, City, raw, per gal.	47¢
Linseed, City, boiled	43¢
Linseed, Western, raw	38¢
Lard, City, Extra Winter	75¢
Lard, City, Prime	77¢
Lard, City, Extra No. 1	75¢
Lard, City, No. 1	45¢
Lard, Western, prime	45¢
Cotton-seed, Crude, prime	34¢
Cotton-seed, Crude, off grades	32¢
Cotton-seed, Summer Yellow, low, prime	39¢
Cotton-seed, Summer Yellow, off grades	36¢
Sperm, Crude	70¢
Sperm, Natural Spring	75¢
Sperm, Bleached Spring	80¢
Sperm, Natural Winter	81¢
Sperm, Bleached Winter	86¢
Whale, Crude	48¢
Whale, Natural Winter	48¢
Whale, Bleached Winter	51¢
Whale, Extra Bleached	52¢
Sea Elephant, Bleached	52¢
Winter	35¢
Menhaden, Crude, Sound	35¢
Menhaden, Crude, Southern	39¢
Menhaden, Light Pressed	40¢
Menhaden, Bleached Winter	43¢
Menhaden, Extra Bleached	46¢
Tallow, City, prime	60¢
Tallow, Western, prime	55¢
Cocoonut, Ceylon	54¢
Cocoonut, Cochinn	54¢
Cod, Domestic	42¢
Cod, Foreign	44¢
Red Elaine	44¢
Red Saponified	44¢
Bank	38¢
Straits	39¢
Olive, Italian, bbls.	58¢
Nestfoot, prime	75¢
Palm, prime, Lagos	74¢

Mineral Oils—

Black, 29 gravity, 25 @ 30 cold test	7¢
Black, 29 gravity, 15 cold test	7¢@8¢
Black, 29 gravity, summer	6¢
Cylinder light, filtered	14¢

Cylinder, dark, filtered	10¢
Paraffine, 23 1/2 @ 24 gravity	11¢
Paraffine, 25 gravity	10¢
Paraffine, 28 gravity	7 1/2¢
Paraffine, red	9 1/2¢

Paints and Colors—

Barytes, Foreign, 10 lb.	\$22.00
Barytes, Amer. floated	\$22.00
Barytes, Amer. No. 1	\$18.00
Barytes, Amer. No. 2	\$13.00
Barytes, Amer. No. 3	\$11.00
Blue, Celestial	6¢
Blue, Chinese	40¢
Blue, Prussian	25¢
Blue, Ultramarine	8¢
Blue, Spanish	3 1/2¢
Brown, Vandike, Amer.	3¢
Brown, Vandike, English	6¢
Carmine, No. 40, in bulk	2.75
Carmine, No. 40, in boxes or barrels	2.85
Carmine, No. 40, in ounce	3.75
Chalk, in bulk	1.75
Chalk, in bbls.	33¢
China Clay, English	13.00
Cobalt Oxide, prep'd	9.00
Cobalt Oxide, black	1.90
Cobalt Oxide, black, less 100 lb.	1.98
Green, Paris, in bulk	10¢
Green, Paris, 170 @ 175 lb.	10 1/2¢
Green, Paris, small pack	12¢
Green, Chrome, ordinary	6¢
Green, Chrome, pure	22¢
Lead, Eng., B.B. white	8 1/2¢
Lead, Amn. White, dry or in oil	7¢
Kegs, lots less than 500 lb.	6 1/2¢
Kegs, lots 500 lb. to 5 tons.	6 1/2¢
Kegs, lots 5 tons to 12 tons.	6 1/2¢
Kegs, lots 12 tons and over.	6 1/2¢
Lead, White, in oil, 25 lb tin	12¢
Lead, White, in oil, 12 1/2 lb tin	12¢
Lead, White, in oil, 1 to 5 lb	12¢
Lead, Red, bbls. and 1/2 bbls.	6¢
Lead, Red, kegs	6 1/2¢
Litharge, kegs	6 1/2¢
Litharge, bbls. and 1/2 bbls.	6¢

TERMS, &c.—Lead and Litharge.—On lots of 500 lb or over, 60 days' time or 2 1/2 % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle	1.35
Ocher, French Washed	1 1/4¢
Ocher, German Washed	1 1/4¢
Ocher, Mineral, English	8 1/2¢
Orange Mineral, French	10¢
Orange Mineral, German	8 1/2¢
Orange Mineral, American	8 1/2¢
Paris White, English Cliff	1.00
Paris White, American	65¢
Red, Indian, English	5 1/2¢
Red, Indian, American	2¢
Red, Turkey	9¢
Red, Tuscan	9¢
Red, Venetian, American	1.00
Red, Venetian, English	1.20
Sienna, Italian, Burnt and Powd.	4¢
Sienna, Ital., Burnt Lumps	1 1/2¢
Sienna, Ital., Raw, Powd.	4 1/2¢
Sienna, Ital., Raw, Lumps	1 1/2¢
Sienna, American, Raw	1 1/2¢
Sienna, American, Burnt and Powd.	1 1/2¢
Talc, French	1¢
Talc, American	1 1/4¢
Terra Alba, Fr'ch, 100 lb	95¢
Terra Alba, English	95¢
Terra Alba, American No. 1	65¢
Terra Alba, American No. 2	45¢
Umber, Turkey, Burnt and Powd.	3 1/2¢
Umber, Turkey Bnt. Ln.	2 1/2¢
Umber, Turkey, Raw and Powd.	3 1/2¢
Umber, Turkey, Bnt. Amer.	1 1/4¢
Umber, Turkey, R'w Amer.	1 1/4¢
Yellow, Chrome	10¢
Vermilion, American Lead	11 1/2¢
Vermilion, Quicks'er, bulk	57¢
Vermilion, Quicks'er, bags	58¢
Vermilion, Quicksilver sm't	62¢
Vermilion, English Import	85¢
Vermilion, Imitation, Eng.	8¢
Vermilion, Trieste	90¢
Vermilion, Chinese	82 1/2¢
Whiting Common, 100 lb	37 1/2¢
Whiting Gliders	45¢

Zinc, American, dry	4¢
Zinc, French, Red Seal	7 1/2¢
Zinc, French, Green Seal	9¢
Zinc, French, V. M. X	7¢
Zinc, Antwerp, Red Seal	7 1/4¢
Zinc, Antwerp, Green Seal	7 3/4¢
Zinc, German, L. Z. O.	6 1/4¢
Zinc, V. M. in Poppy Oil, G. Seal, lots of 1 ton and over	10 1/4¢
Zinc, V. M. in Poppy Oil, Red Seal, lots less than one ton	11¢
Zinc, V. M. in Poppy Oil, Red Seal, lots of 1 ton and over	10¢
Discounts.—French Zinc.—Discounts to buyers of 10 bbls. lots of one or assorted grades, 15 : 25 bbls. 2 : 50 bbls. 4%.	
No discount allowed on less than bbl. lots.	

Colors in Oil—

Black, Drop, Frankfort	25¢
Black, Drop, English	12¢
Black, Drop, Domestic	7¢
Black, Lampblack, Best	20¢
Black, Lampblack, Common	13¢
Black, Ivory	8¢
Blue, Chinese	35¢
Blue, Prussian	20¢
Blue, Ultramarine	12¢
Brown, Vandike	7¢
Green, Chrome	8¢
Green, Paris	18¢
Sienna, Raw	7¢
Sienna, Burnt	7¢
Umber, Raw	7¢
Umber, Burnt	7¢

Putty—

In barrels and 1/2 bbls.	.013¢
In tubs	.015¢
In tin cans	.014¢
In bladders	.014¢

Spirits Turpentine—

In regular bbls.	.29¢
In machine bbls.	.30¢

Glue—

Low Grade	8¢
Cabinet	12¢
Medium White	13¢
Extra White	17¢
French	10¢
English	10¢
Irish	12¢

THE IRON AGE.

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